The IRON AGE

December 24, 1959 A Chilton Publication The National Metalworking Weekly

Dravo's Fike Checks Stocks As—

Inventory Buildup Points to Record First Half '60 P. 17

Inspect Hot Blooms With No Time Loss – P. 45

Is Magnesium Behind Its Sales Timetable? – P. 22

Digest of the Week – P. 2-3

Hats off to the profit makers!

Maintenance departments are major profit makers. Here's why:

A 10% reduction in maintenance costs can result in a *4% jump in profits in the average plant*—according to latest Commerce Department figures.

Increasing numbers of cost-conscious maintenance men are adopting Organized Lubrication as one of the proven ways to reduce costs. As Texaco Lubrication Engineers have demonstrated time and again, an Organized Lubrication program can *cut direct maintenance costs as much as 10%!* (Other benefits: more dependable production, reduced lube inventory, simplified purchasing.)

Managers throughout the U.S. who have installed and evaluated Organized Lubrication programs can testify to the profit gained.

Texaco Lubrication Engineers can offer help and helpful material to start an Organized Lubrication program in your plant. Why don't you look into it? Call our expert—or write for a copy of our book: "Organized Lubrication . . . Major Cost Control Factor."

☆ ☆ ☆

Texaco Inc., 135 East 42nd Street, New York 17, N. Y., Dept. **IA-131.**

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

It's a personal letter... but we'd like everyone to know how we feel about STEEL SERVICE CENTERS

STEEL SERVICE CENTER INSTITUTE

Bethlehem Steel Company
(INCORPORATED)

J. V. HONEYCUTT
VICE PRESIDENT

Bethlehem, Pa.

December 3, 1959

Mr. Robert G. Welch
Executive Vice President
Steel Service Center Institute
540 Terminal Tower
Cleveland 13, Ohio

Dear Bob:

As you well know, I have made a practice for years of keeping in close contact with your Association and of following with great interest the part played by my many friends in the various Steel Service Centers who comprise your membership.

Frankly, other than in wars, I don't know of any period where the results of their foresight, investment, and other policies have been of more benefit to our economy and our people than during the present critical steel situation. Many times I've had to listen to theorists in high places argue about the value of these Service Centers (and you know where!), but there could be no more conclusive proof than to look at the broad list of companies helped by the Steel Service Centers all over the country to continue their operations, thereby employing many people which they otherwise couldn't have done during recent weeks.

Today, it is impossible for any one to foresee the ultimate solution to our present problem, but one thing of which I am sure is that your membership has again deserved the spotlight focused on the contributions they have made to the welfare of our country and on the importance of their role in the steel business. This should be very gratifying to you and to each of them, as I can assure you it is to me.

Best personal regards.

Yours sincerely,

J. V. Honeycutt
Vice President

JVH:ds

BETHLEHEM STEEL

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The IRON AGE

December 24, 1959—Vol. 184, No. 26

Digest of the Week in

*Starred items are digested at right.

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NEWS ARTICLES

PELLETS AS CHARGE

Boost Pig Iron Tonnage — Test at Armco Steel with taconite pellets as furnace charge produced dramatic results. Other mills are studying the development. P. 21

MAGNESIUM

Behind Schedule—In developing magnesium markets Dow Chemical

Co. learned to work other metals. When mag's commercial growth slowed, it branched out. P. 22

STEEL LABOR

Before the Election—The current moves in steel labor don't have much to do with eventual outcome. From now on, everything will be aimed at the "last offer" voting next month. P. 23

LIFO RELIEF

There's Still Hope—A bill introduced last spring is slated for early action when Congress reconvenes.

Metalworking

◀ COVER FEATURE

Inventory Buildup—Nearly all metalworking industries report parts and materials stocks are low, but the demand for finished products is strong—and apt to get stronger. They'll attempt to rebuild inventories while keeping output up. P. 17

It would extend the inventory buildup period for companies using LIFO accounting systems. P. 25

ALASKAN GROWTH

A Slight Delay — Don't expect any metalworking boom in Alaska for a while. Minerals potential is good, but present economy is poorly balanced. P. 39

FEATURE ARTICLES

INSPECT THICK SECTIONS

With Betatrons—Industry needs something more than conventional X-ray equipment to search out defects in thick blooms or billets. The instrument needed could be the fast-acting, deep-penetrating betatron. This unit will examine extra-heavy sections — up to 20 in. in thickness. P. 45

EXPLOSIVE FORMING

Makes Powder Parts—A new explosive-forming technique produces powder compacts in the sintered condition. Key to the process is the compacting of metal above its recrystallization temperature. The technique forms materials with improved properties. P. 48

WELDING IN THE ARCTIC

For National Defense—Our government relies on the ability of equipment to operate under new and different conditions. In Greenland, 36 welding machines met this challenge by running 24 hours a day in sub-freezing weather to produce 88 miles of welds. P. 52

MULTIPLE SPINDLES

For Camshaft Production — Sometimes automation between special machines isn't the only answer to efficient output. You might realize bigger dividends by combining several operations into one multiple-spindle unit. P. 54

DIVIDE PRODUCTION

To Cope with Variables—A decision to pull troublesome parts from general production flow has paid off. The new setup handles these parts by using all equipment to best advantage, despite variations in components. P. 56

MARKETS & PRICES

HOW BUYERS BUY

Hidden Motives — A new study applies motivation research to industrial buying. It reveals buyers attitudes toward seller, opinions on what makes a better salesman. P. 24

ELECTRO-MACHINING

Looks Ahead—Chipless methods of metal removal still look promising for the future. But a lot of development work is needed before they're used for jobs requiring high production rates. P. 41

STEEL SUMMARY

Buildup Factors — Building up workable steel inventories is the biggest single problem facing steel users. Only record steel production will enable major steel consumers to meet their own schedules and permit some building up of steel supplies. P. 75

MORE PRODUCTION

Looking Ahead — Pump and compressor makers are looking for more production in 1960. Their real fear, however, is another steel walkout. P. 76

NEXT WEEK

WORLD STEEL

Markets—Next week's feature is a year end report on world steel production. It tells who's gaining, about changing market patterns and the Russian threat. It asks: Can Western Europe absorb its new capacity?

B&W has taken the step...

a NEW PLANT at Beaver Falls for the manufacture of a

COMPLETE LINE OF WELDING FITTINGS AND FLANGES

Beaver Falls, Pennsylvania is the site for B&W's new Welding Fittings plant. When in operation it will be one of the most efficient sources of supply in the industry . . . one that has been designed with product quality as well as customer service in mind. Not only will it have facilities for the manufacture of a complete line of carbon, alloy and stainless steel fittings and flanges, but its location makes possible integration with B&W's other manufacturing operations . . . their steel mills and their tube mills.

This means that

(a) you can get a complete line of welding fittings and flanges

(b) you can get a complete process piping package — welding fittings, flanges *and* tubular products from one source

(c) you can more effectively control both buying and delivery from one manufacturer . . . The Babcock & Wilcox Company

An announcement of the transfer of welding fittings operations from Milwaukee to Beaver Falls will be made in the near future.

For further details ask for bulletin FDM-2016 or call on any of the local B&W District Sales Offices. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

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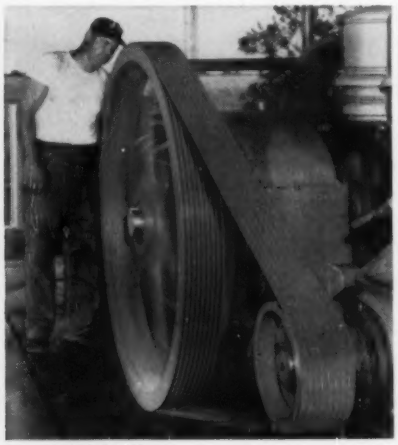
B.F.Goodrich

V belt briefs

TIPS ON THE CARE, MAINTENANCE AND SELECTION OF V BELTS FOR INDUSTRY

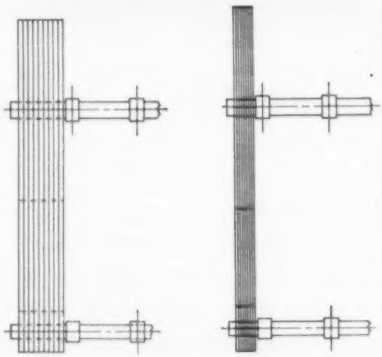
ORDINARY V BELT DRIVE



MAXIPOWER DRIVE

SAVE $402.14 ON V BELT DRIVES—*Costs for* both *sheaves and V belts were cut when B.F. Goodrich Maxipower belts replaced ordinary belts on this drive. Size and weight of sheaves were reduced, smaller and fewer V belts were used*—eight *5V2500 belts replaced* nine *D-240 belts. The result: a $402.14 saving. Costs can be cut as much as 30% by switching to a Maxipower V belt drive.*

How Maxipower V belts reduced bearing load 42%

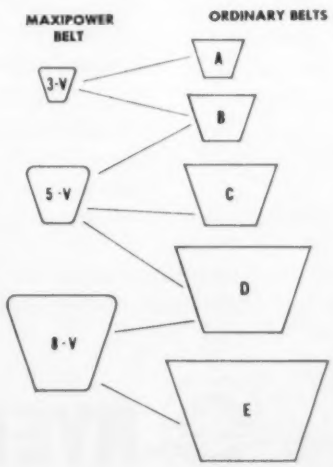


ORDINARY DRIVE — MAXIPOWER DRIVE

In the installation shown above, sheaves for the Maxipower drive are lighter, have a face width of only 5 13/16", compared to a 13¼" width for the sheaves on the ordinary drive. Because there's less weight, less shaft overhang, bearing load for this Maxipower drive is 42% less for the driven shaft shown than the drive replaced. This greatly increases bearing life.

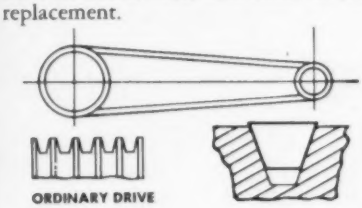
With Maxipower V belts, three cross sections do the work of five

Each cross section of the new B.F. Goodrich Maxipower V belts has been fitted to a particular horsepower range so that only three cross sections are needed instead of the A, B, C, D, and E sections of conventional V belts. The three cross sections are 3V, 5V and 8V.

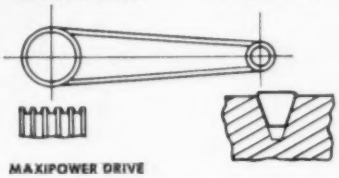


New BFG Maxipower V belts save space, weight, bearings, dollars

New B.F.Goodrich Maxipower V belts give up to three times the horsepower-carrying capacity in the same amount of space as ordinary belts. This more compact drive gives you more horsepower per dollar, results in substantial savings, both in initial costs and often in belt replacement.



ORDINARY DRIVE



MAXIPOWER DRIVE

In most Maxipower installations, fewer belts and smaller diameter sheaves are used, center distances are shorter. Costs can be cut up to 30%, valuable space is saved. Sheaves have narrower grooves and groove spacing, are smaller, less costly. The smallest sheaves that can safely be used with the drive motor can be installed. Often these will be 50% smaller than present drives. This reduced sheave weight and face width means less shaft overhang, less bearing load—increased bearing life.

The extra strength of Maxipower V belts comes from its new rubber compounds, the tough fibers used in its load-carrying cords, and the new "deep V" design. Because of this design the belt's load-carrying cords are supported so completely that each has an equal share in the load—none "loaf".

All Maxipower V belts are heat-resisting, oil-resisting at no extra cost. Belts with static conducting properties can also be ordered *at no extra cost.*

For further information and help in selecting Maxipower belts for your drives, call your B.F.Goodrich distributor. *B.F.Goodrich Industrial Products Company, Dept. M-758, Akron 18, Ohio.*

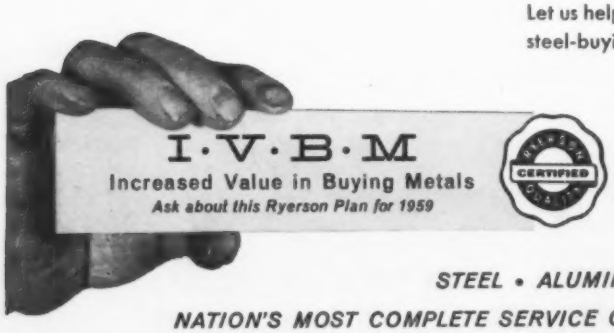
B.F.Goodrich V belts

but only one was right for the job

Severe stresses imposed by this forming operation caused a high rate of reject for a fabricator using hot rolled plate to the usual ASTM—A7 specification. A call to his Ryerson Steel Specialist brought a suggested change to Ryerson welding and forming plate—a prompt solution to a costly problem.

Even in "plain carbon steel" applications, there's usually only one steel that's *exactly right* for each job. Nationwide, daily experience with a wide range of material selection and fabricating problems puts your Ryerson Specialist in the best position to know what is exactly right for *your* job. Backed by complete and diversified stocks, Ryerson can best supply that exact specification fast!

Let us help you make sure you get optimum value for your steel-buying dollars on every order—call Ryerson today.



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Lest We Forget:

What Are The Steel Issues?

The steel hassle is hopelessly and emotionally fog-bound. Both sides are poles apart—from what the other thinks. How there will be a settlement is hard to see.

The steel industry is committed to a non-inflationary contract. If the cost exceeds average productivity gains, it must come from somewhere else. Either it comes from higher prices or it comes out of earnings.

To take wage-fringe costs from earnings at the expense of the business would eventually ruin workers, owners—and the business. To get it from higher prices would cause inflation and torpedo the demand of the President for no price increase. Also, it would ignore the law of diminishing returns on price increases.

So, the steel industry offers a wage-fringe increase costing 10¢ an hour. It is slightly more than the average productivity gain per year. To help pay the cost, the companies want to change archaic work practices. They have agreed to arbitrate this.

The union wants a wage-fringe increase the companies say is inflationary. The union says its demand is about 10¢ an hour. Adding probable cost of living raises brings it closer to 12¢ an hour or more. Steel firms say the real cost of this would be 15¢ an hour or more.

Both sides deny each other's estimate of fringe benefit costs. Here is where they differ the most. Neither has been able to agree on such estimates.

The union says it can't agree to giving management a free hand in abolishing or changing local practices. It claims these were bargained for years ago and represent rights and privileges of the workers. If arbitrated, the union says the best it can get is to hold what it has and the worst it can get is to lose what it has.

There the matter rests—uneasily. Chances for a voluntary settlement are slim—almost zero. Yet an imposed or mandated settlement won't settle anything. Sooner or later the union must do its part to help support its industry, keep it strong, and cooperate in its growth. To do otherwise would weaken it competitively here and abroad and help bring about strict controls —or both.

No matter how this hassle is settled, the jig is up for big annual steel price increases. So is it up for annual inflationary wage hikes.

These are the cold unadulterated facts!

Tom Campbell

Editor-in-Chief

Building Today, with an Eye to Tomorrow

MEETING *of* MINDS!

Each of these men has an expert mind in his field—administrative, sales, finance, raw materials, production. Each contributes years of practical experience, rigorous theoretical knowledge and proven executive ability. Together they constitute Inland Steel Company's Products and Facilities Planning Committee—keeping a watchful eye on consumer and industrial trends and requirements, guiding the company's development and expansion.

To their attention are brought market studies, design forecasts, new product possibilities, material resource potentials, new production methods, future equipment needs. They are excellent listeners, they travel often to see for themselves, and they are doers—initiating programs which have upped Inland's steelmaking capacity 15% to 6,500,000 ingot tons in just three short years.

The work of this committee, like the future of America's expanding economy, is never ending. Keeping pace with midwest industrial growth, Inland completes each stage in its expansion plan and looks ahead . . . for the next job.

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Infrared at Work

Infrared radiation thermometers are proving to be efficient industrial aids. By measuring the thermal or infrared radiation emitted, a thermometer can determine object temperatures without physical contact. One unit is measuring the temperature of steel strip at several positions within a vertical tinplate annealing furnace coating section, where the strip moves at 2000 fpm.

Nuclear Fuel Meets Needs

There will be plenty of nuclear fuel for power and other uses for the next 15 years. Top atomic experts say present supplies of uranium 235 can meet all weapons needs and supply two to four times presently projected power and industrial uses.

Remove Casting Cores

Copper tubes, covered by flexible stainless sheaths, form internal passages in magnesium castings. After the castings cool, acids dissolve the copper tubes. This allows removal of the flexible (acid guard) sheaths. Integral passages in the lightweight magnesium castings carry hydraulic fluids. This patented process eliminates costly machining and external piping.

Low Temperature Cyaniding

From Europe comes word of a low temperature (550°-560°C) cyaniding process. Advantages include: Absence of quenching with consequent reduction of deformation; diffusion at a rate of 0.1 mm per hr; use for low carbon steels and cast iron as well as alloy steels.

How to Fabricate Tungsten

Recent study covers most aspects of tungsten fabrication. The report points out that the difficulty in fabricating tungsten is tied up with the high strength of the wrought metal and its directional properties. Other highlights: Ease of consolidation through powder metallurgy techniques; high ductile-brittle transition temperature range; difficulty in welding tungsten to itself; success with brazing.

Cleans Metal Chips

A continuous metal chip handling and cutting oil recovery system has been installed at a new bearing plant. The system continuously conveys metal turnings from two lines of automatic screw machines, crushes the turnings to a uniform size, extracts and sterilizes cutting oil from the chips, and stores and loads the oil free chips into railroad cars.

New Columbium Alloy

First in a series of new columbium base alloys was recently announced. Developed by Union Carbide Metals, the new alloy—Cb 65—has an ultimate tensile strength of 37,000 psi at 1800°F. The alloy was designed to maintain low neutron cross section and to provide increased mechanical strength and oxidation resistance over that of pure columbium.

Cuts Casting Shrinkage

Special refining technique reduces and controls shrinkage tendencies in a new grade of aluminum casting alloys. Developed by Asarco, the new grade metal eliminates the need for extra gates and risers. The high degree of casting control possible with the new alloys results in more uniform pressure-tight castings. Process does not affect physical or mechanical properties.

Speeds Up Maintenance

Problem of coordinating efforts of tooling, maintenance and repair personnel in long transfer lines is ingeniously solved in one parts supplier plant. The answer: A public address system with an operator at the control station. Other workmen have low-cost, short distance transmitters to keep operator posted on their activities and location.

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WIDE SHEARED STEEL PLATE ASTM A-7?

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110 Tons 3/16" x 84" x 240"
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54 Tons 1/2" x 84" x 360"
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100 NT—5/16" x 72" x 240"
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75 NT—1/2" x 72" x 240"
75 NT—1/2" x 84" x 240"

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AMERICAN CANCER SOCIETY

LETTERS FROM READERS

Standardization

Sir — In your Nov. 26 issue on page 51 was an article entitled "Don't Overlook Standardization." You refer in that article to the American Standards Association but give no address for this organization. We are unable to locate an address here and would appreciate your sending it to us.

The article is quite impressive in its showing of cost savings by using standards. This article will be another aid in my campaign to get separate funding from management for the standards work that is being carried on not only in this plant of Aerojet but also in the other plants.

I hope that the Standards Association can also assist me in this effort. At the present time it is carried on strictly as a department overhead budget. This is undesirable for a number of reasons, and we hope to get it changed.—J. J. Brugman, Supervisor, Specifications and Standards, Aerojet - General Corp., Downey, Calif.

▪ **The address is: American Standards Assn., 70 E. 45th St., New York, N. Y.—Ed.**

Agreement

Sir—First let me express my appreciation for the effort you are making toward a more general understanding of the crucial issues at stake in the present strike.

It seems evident that the greatest need at this time is for an understanding among the general public of the basic issue, other than money, which is presently being contested with such determination.

I certainly agree with you that the relevant points in this debate should be presented in picture-book form to communicate effectively with the jury.

Perhaps a campaign to disseminate sound information among editors of publications which reach the general public would be a most rewarding enterprise. It probably would not be accepted from either of the opposing interests but you could perhaps sponsor such a campaign.—H. E. Cable, Weld Tooling Corp., Pittsburgh.

Laboratory Interest

Sir — We would like to receive six reprints of the article in your Nov. 5 publication having to do with DuPont & Co.'s new "Spray-In-Vapor Method."

We hope you will be able to comply with this request as it is of great interest to our laboratory and sales organization. — W. D. MacDermid, President, W. D. MacDermid Chemical Co., Bristol, Conn.

▪ **Reprints have been mailed.—Ed.**

Good for Schools

Sir—I found your feature article on "Four Ways to Spur Production on Your Present Plant Site" most interesting. This is good teaching matter for school shops to bring to students' attention.

I request two copies of the article. —C. S. Horn, Teacher, Metalworking, Woodland Hills, Calif.

Sir — Please send ten copies of the article "Four Ways to Spur Production on Your Present Plant Site."—F. Voos, Superintendent, The Risdon Mfg. Co., Naugatuck, Conn.

Christmas Spirit

"Deck the Halls with Strips of Metal," might become a more and more popular tune as decorators are turning to metals to make new dazzling Christmas displays.

One of the most spectacular displays is found in the John Wanamaker department store at Philadelphia. There, a six-story aluminum Christmas tree stands in the center of the store's Holiday display.

Real Appearance—Made of aluminum produced by the Olin Aluminum Div. of Olin Matheson Chemical Corp., the tree's 1126 branches vary in length from eight in. to 14 ft. The highly reflective aluminum sheets give a natural appearance when surrounding fountain lights are predominantly green.

HELPER: Jane Siebeling, 18, helps trim the Kohler Co. tree.

The control system for the water fountains and lighting display was designed by Hubert Medland, a Philadelphia electronics consultant, who does much guided missile work.

Frederick M. Yost, Wanamaker vice president, began designing the tree last February. Fabrication required three months.

Another Idea — Using another metal to get original effect, Kohler Co., Kohler, Wis., used brass turnings to decorate the tree standing in the company's office building lobby.

Except for lights and an angel at the top, all decorations are turnings from rods and tubes used in making brass faucets and other plumbing fittings.

Wanted: Inventions

Do you have any inventive ideas floating around in your mind? If you do, the Department of Commerce's most recent issue of "Inventions Wanted by the Armed Forces" should be of interest.

The booklet can be obtained through the Philadelphia Field Office, U. S. Dept. of Commerce, 1015 Chestnut St., Philadelphia 7, Pa.

Foreign Market

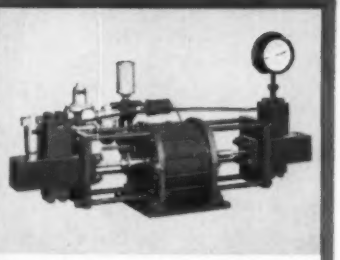
Like most people who are interested in the welfare of the steel industry in this country, we are distressed by the drying up of the export market.

But we are happy to report that all is not entirely lost. The following is taken from a letter of a prospective Italian customer. It is trying to locate steel companies here who might be interested in an export outlet:

Their Needs—"We should like to import in Italy large quantity of iron sheet of poor quality, as well as those sheets resulting during the rolling process when a sheet is welded to the following one, range of thickness .016 to .16 in.

"We should also like to buy plate iron sheet mixed in various sizes and thicknesses in bulk like rejects of the working day, and import them in Italy where we'll choose and part them."

ALDRICH
AIR-DRIVEN HYDRAULIC PUMPS



For production service: Heavy duty 6-inch stroke pump, single or double acting.

For production or laboratory . . . handling small volumes of fluid at pressures up to 50,000 psi.

For hydrostatic testing . . . tubing, valves and pressure vessels.

For operating hydraulic presses, cylinders and valve positioners.

Immediate shipment from factory stock.

For intermittent service: 3-inch stroke pump has low first cost, high reliability.

Aldrich air-driven hydraulic pumps operate on normal plant air. They are compact, simple to install, economical to operate. Write today for Data Sheet 36 (6-inch stroke) or Data Sheet 36A (3-inch stroke).

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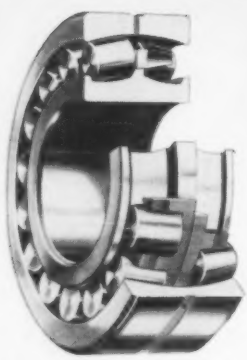
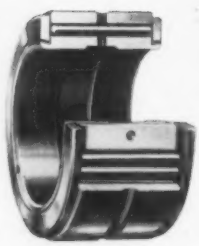


from
power shovels...



to
helicopters

Torrington makes the right anti-friction bearing for every basic need!

Application requirements differ. A lightweight, high-capacity Torrington Needle Bearing is just right for a helicopter. But it's a different story with a mammoth power shovel, where Torrington Spherical Roller Bearings or Tapered Roller Bearings perform best.

Between these two examples lie all kinds of requirements. To meet the broad range of needs, Torrington makes every basic type of anti-friction bearings.

This range of experience can be of invaluable service to you in engineering your own anti-friction applications. Your Torrington representative is well qualified in your field: call on him for engineering assistance. **The Torrington Company, Torrington, Conn.—and South Bend 21, Ind.**

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COMING EXHIBITS

Plant Maintenance & Engineering Show — Jan. 25-28, Convention Hall, Philadelphia. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Tool Show—April 21-28, Detroit Artillery Armory, Detroit, (American Society of Tool Engineers, 10700 Puritan, Detroit 38.)

Welding Show—April 25-29, Great Western Exhibit Center, Los Angeles. (American Welding Society, Inc., 33 West 39th St., New York 18.)

Southwestern Metal Show — May 9-13, State Fair Park, Automobile Bldg., Dallas, Texas. (American Society for Metals, Metals Park, Novelty, O.)

Design Engineering Show — May 23-26, Coliseum, New York. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Production Engineering Show—Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

MEETINGS

JANUARY

Institute of Scrap Iron & Steel, Inc. —Annual convention, Jan. 10-13, Fontainebleau Hotel, Miami Beach, Fla. Institute headquarters, 1729 H St., N. W., Washington, D. C.

Society of Plastics Engineers, Inc. —Annual technical conference, Jan. 12-15, Conrad Hilton Hotel, Chicago. Society headquarters, 65 Prospect St., Stamford, Conn.

Society of Automotive Engineers, Inc.—Annual meeting, Jan. 12-16, The Sheraton-Cadillac and Statler Hotels, Detroit. Society headquarters, 485 Lexington Ave., New York.

PETERSON
STEELS, INC.
THE 52100 HOUSE
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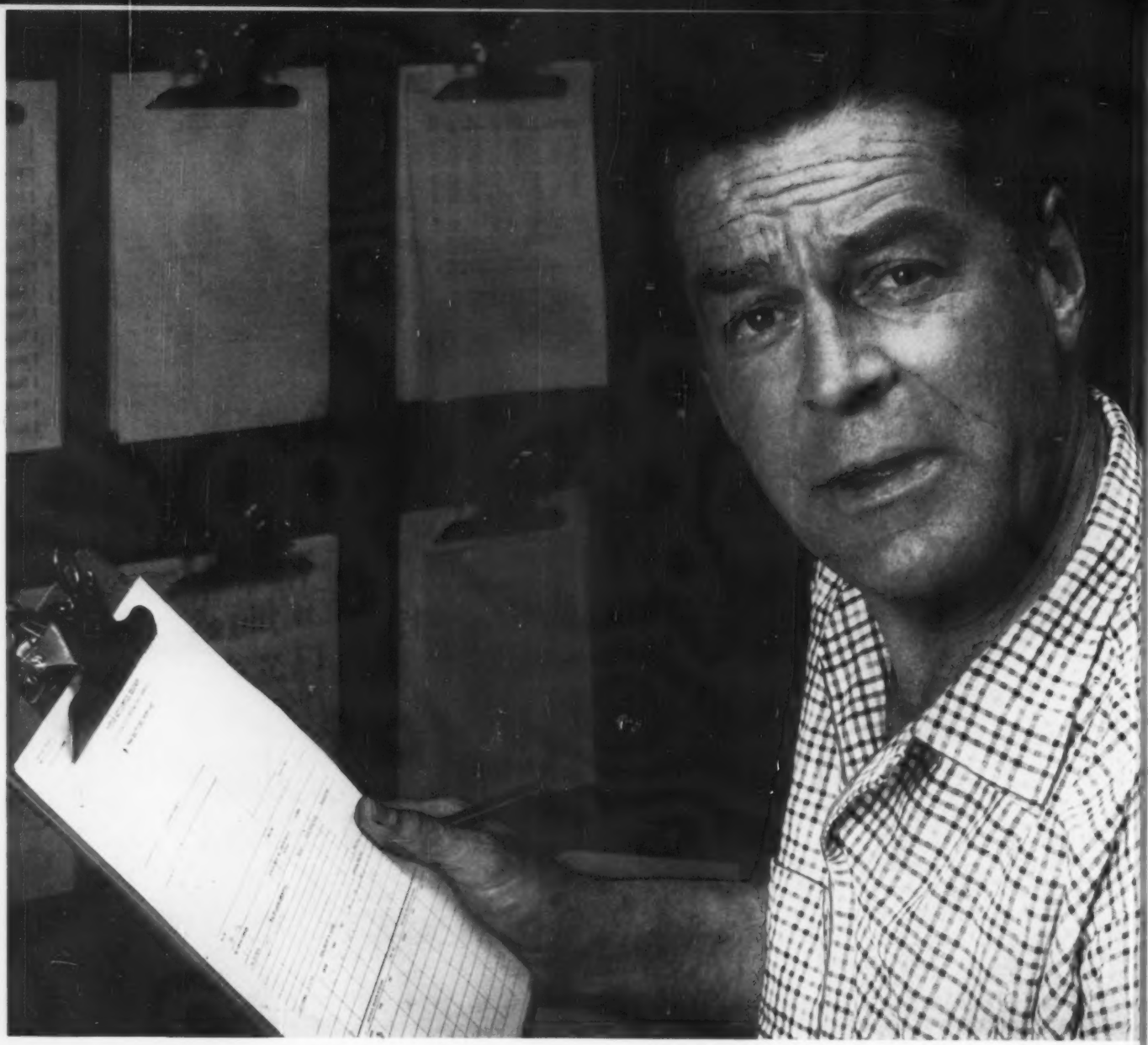


"Bagged alloys help keep our inventories straight"

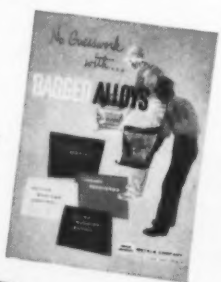
Chief Clerks report: Monthly alloy consumption from furnace sheets closely checks with month-end inventories when ELECTROMET bagged alloys are used. Bags eliminate handling losses, aid inventory control, and help keep a cleaner furnace floor.

Melters report: More accurate ladle additions can be made with ELECTROMET bagged alloys. Result: More on-grade heats and closer control over deoxidation. Bagged alloys also yield 10 to 15 per cent higher recoveries in the ladle, cutting alloy costs.

For more information, contact UNION CARBIDE METALS, producer of more than 100 alloys—11 supplied in bags.

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.
In Canada: Union Carbide Canada Limited, Toronto.

Write for this new folder outlining bagged alloy advantages and specifications.



UNION CARBIDE METALS

Electromet *Brand Ferroalloys and other Metallurgical Products*

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INVENTORY BUILDUP IN EARLY MONTHS OF 1960 is the major factor in the business picture. Steel is the principal product, of course. But other basic materials as well as parts and components are in low supply. And it won't be easy to build stocks because demands of scheduled production will be equal to flow of supplies. Competition for materials will be cut-throat.

MOTIVATION RESEARCHERS ARE APPLYING their techniques to industrial buying. A study by the Industrial Advertising Research Institute finds the purchaser's subconscious ideas and attitudes have a powerful influence on his buying. Findings suggest marketing and advertising can profit from studying these hidden influences.

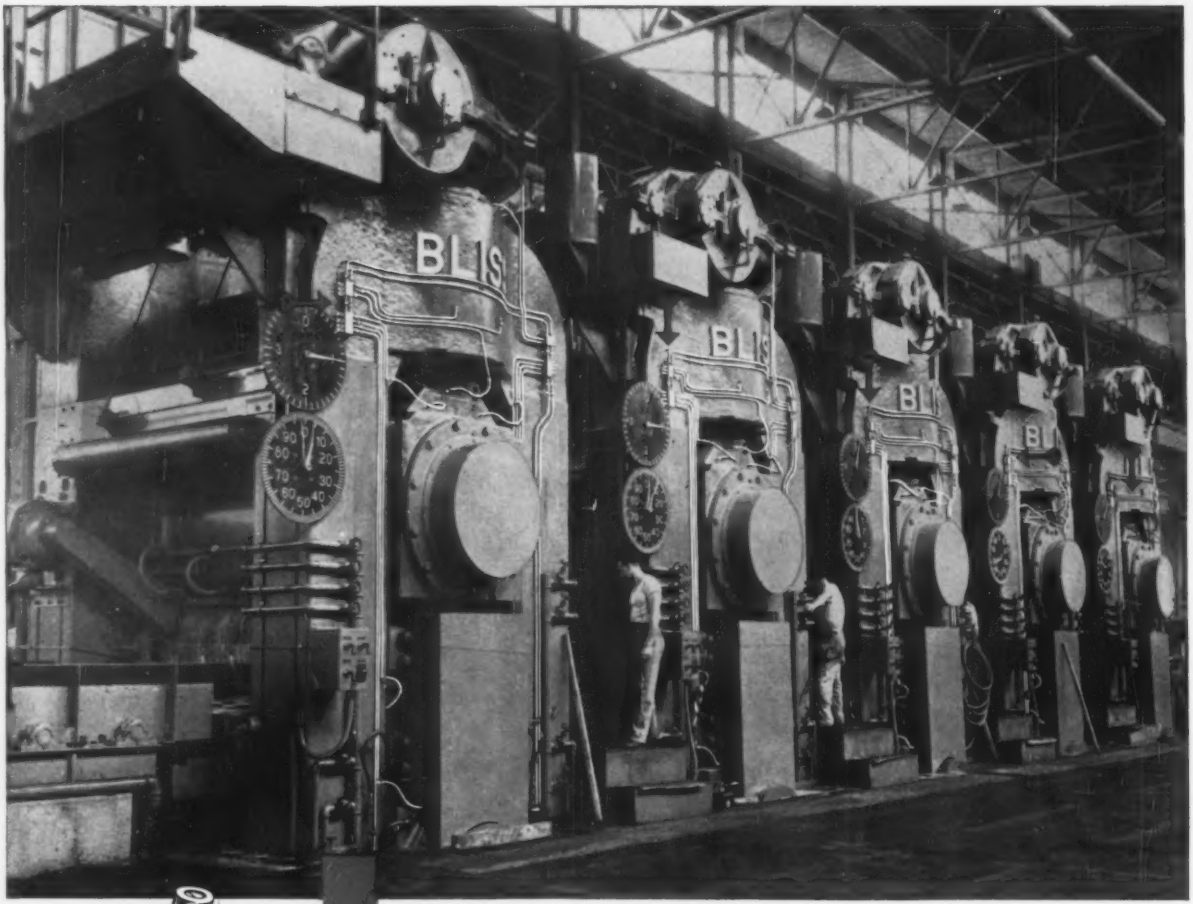
AUTOMAKERS ARE RAISING THEIR PRODUCTION sights every day. If they can get the steel, the industry hopes to sell more than 7 million cars. George Romney of American Motors says compact and smaller car sales should total at least 2,350,000. (See world market effects, below)

LOOK FOR AT LEAST A SMALL OUTBURST OF new facility announcements in the steel industry shortly. A new alloy bar mill will be disclosed by a Midwest mill. In the East, a plate mill and a hot-strip mill are in the advanced planning stage.

LOW COST AND VERSATILITY OF direct reduction are attracting interest for the process from unlikely places and people. Equipment men are getting inquiries from Georgia, Tennessee, upstate New York and the Northwest.

THE ATOMIC ENERGY COMMISSION can be a much bigger market for U. S. industry--if the AEC can be persuaded to turn over to private industry some of the work it can perform. U. S. Chamber of Commerce can point to 36 specific examples of opportunities for private industry, from nuclear fuel to machine shops.

EFFECTS OF U. S. COMPACT CARS on the world auto market are still to be determined. One sure thing: They are already stirring up a storm of interest, both here and abroad. Foreign automakers believe they will stimulate their own markets here. U. S. manufacturers are ready to go all-out for the export market. Some go so far as to claim the new U. S. product could restore the favorable balance of U. S. automotive trade.



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Centralized
Lubrication
No. 244

Farval protects all vital bearings on Bliss Non-Ferrous Hot Mill

When an up-to-the-minute rolling facility like this Bliss 80-inch, 4-high tandem hot mill is exposed to shut down due to bearing failure, weekly production dives, costs skyrocket.

So to eliminate possible failures of the mill's vital bearings, Bliss engineers installed an automatic Farval heavy-duty, time-clock controlled centralized lubrication system. It delivers proper amounts of lubricant — when required — while the mill rolls aluminum strip at 850 feet per minute.

Write today for your free copy of Bulletin 26-S. It gives all the facts on how centralized lubrication can profitably fit into your particular production picture.

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KEYS TO ADEQUATE LUBRICATION

Wherever you see the sign of Farval—familiar valve manifolds, dual lubricant lines and pump stations —you know rolling mill equipment is being properly lubricated.

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Inventory Buildup Plans Spark Record First Half in 1960

Nearly every segment of metalworking reports its inventories of goods and materials are low in the face of strong demands.

They say they'll have to rebuild inventories while maintaining output. The combination could produce some record outputs.

▪ From every side, economists predict a greater outpouring of goods and services in 1960 than ever before.

Despite the lengthly steel strike, the Gross National Product is expected to be $480 billion this year. Conservative estimates see it rising to $495 to $500 billion in 1960. And many economists look for it to go even higher.

For the past several months, divisions of the Dept. of Commerce's Business and Defense Services Administration have been preparing outlook appraisals of some 85 industries. In nearly every case, the forecasts are for more business in 1960.

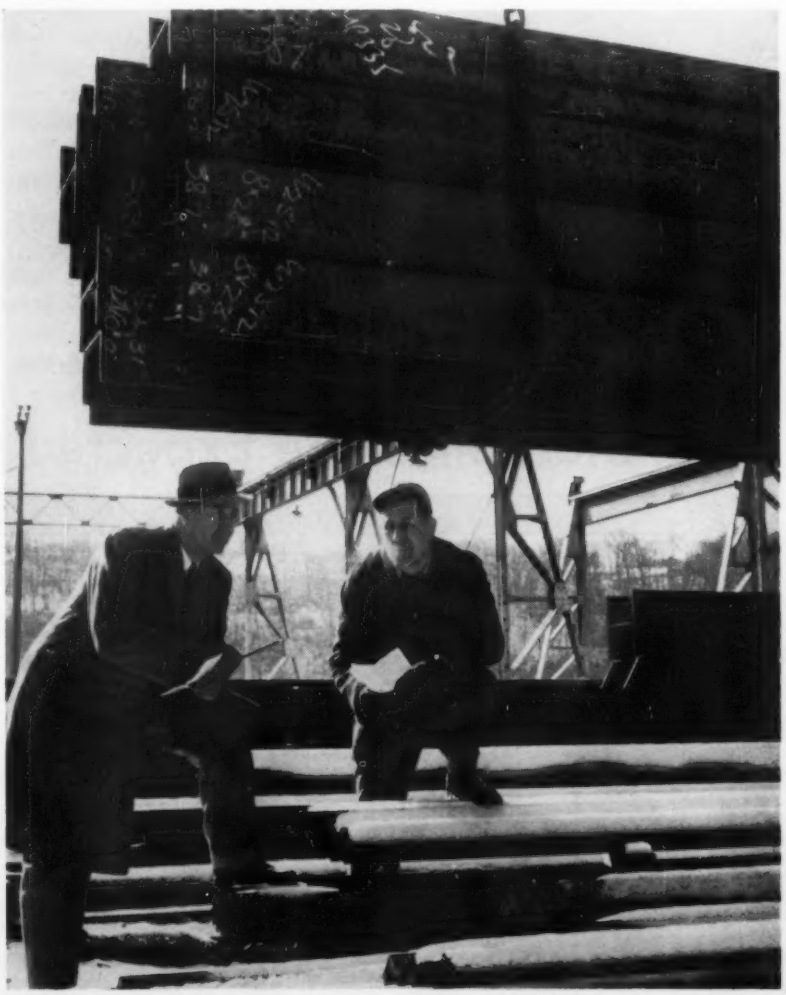
Inventory Force—At the same time, BDSA director H. B. McCoy notes that "nearly every segment of industry is going to have to rebuild inventories."

And this need to rebuild inventories will provide a "very positive and important factor" in pushing the economy ahead, according to L. J. Paradiso, chief statistician for the Commerce Dept.'s Office of Business Economics.

Push from Metalworking — Mr. Paradiso, one of the most authoritative government economists, notes that on nearly all levels the demand is strong and inventories, particularly steel, are low. Demand, he says, will remain high next year—but not of boom proportions when compared with the rate of climb from last year's recession.

The big push, Mr. Paradiso says, will come from metalworking, particularly steel users. They'll be attempting to rebuild stocks of materials, fill production pipelines, and add to thin stocks of finished goods —all in the face of continued strong demand.

"A tabulation of the inventory-sales ratio for August and September shows that an overwhelming



BELOW NORMAL: At Dravo Corp., Pittsburgh, steel buyer Wendell Fike and steelyard foreman Bill Ridosh check to see if enough of the right steel is in stock. Inventories are one-third of normal.

number of product inventories were very low in comparison with other years," he says. Inventory reductions continued through the third quarter and into the fourth quarter.

Steel Ups and Downs — An IRON AGE survey of metalworking revealed how extensive inventory rebuilding will be in the first half of 1960. Steel, particularly flat rolled products, is the key to the metalworking outlook.

It is estimated that inventories of steel hit a low point less than 8 million tons toward the end of November—much of it dislocated as to location, size and type.

When the steel strike began in mid-July, there were about 21 to 22 million tons in the hands of users and steel service centers. It is now estimated that users will start 1960 with 10 to 12 million tons of steel on hand.

Tough to Rebuild—It is expected that users will try to add 9 to 10 million tons of steel to inventories in the first half of 1960. This is about the same amount as was added in the same period of this year.

However, requirements for "current use" are expected to be greater in the first six months of 1960 than they were this year. And it'll be a tug-of-war between the production line and stockpiles.

Many industries need nonferrous metals as well as steel, although stocks of these materials should be adequate. There's little likelihood of nonferrous shortages that alone would slow down metalworking.

Automakers Move In—The battle for steel will be between the auto industry and all other metalworkers. The auto industry traditionally see-saws with construction for the title of largest steel user. It has plans of grabbing the title hands-down in 1960.

Since introduction of new models and the new compact cars last fall, they have revised upwards their estimate of the 1960 auto market. They now look for domestic production to reach a minimum 6.7 million units, 22 pct higher than the 5.5 million cars expected this year. The number predicting 7 million is increasing.

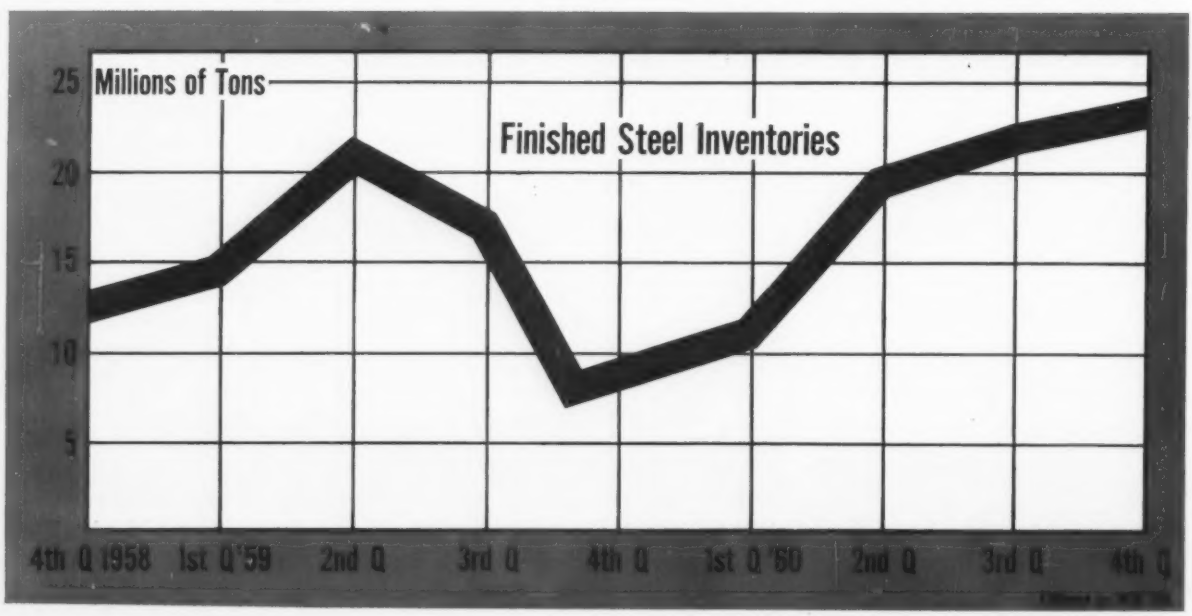
But if automakers are to achieve the promise they see in 1960, they are going to need steel. The industry has nowhere near enough steel to comfortably sustain operations.

Some Observations—Comments John Soelch, purchasing director for Studebaker - Packard Corp: "We're aiming for a strong inventory position on steel and component parts in anticipation of a huge demand for new cars in coming months. We plan to continue a heavy accumulation of inventory into March and April. We've been collecting finished steel to the best of our ability since Feb., 1959."

An automotive stamping plant, located in the East, furnishes an example of how delicate the inventory balance is. Plant inventories were down to 2000 tons of steel in early November. The plant closed. Stocks are now up to about 16,000 tons and the plant is back in operation. But the inventory is only good for two weeks.

No Early Buildup—No buildup is seen possible through January. And on the basis of February allotments, stocks are expected to drop to a 10-day supply. By May, the plant hopes to have its bank built up to about 30,000 tons, enough for 30 days. Only when steel is flowing smoothly will steel stocks be rebuilt to a normal 25 day supply.

Steel Stockpiles Are Expected to Rise Sharply



Even Ford—Even Ford Motor Co., which makes up to 50 pct of its own steel needs, is no exception. G. P. Hitchings, manager of Ford's Economic Analysis Dept. says: "Steel availability is the major problem in how rapidly dealer stocks can be built up to adequate levels."

A company source says it will be two months before Ford's steel supply is comfortable, and five or six months before it has all of the steel it wants for inventory.

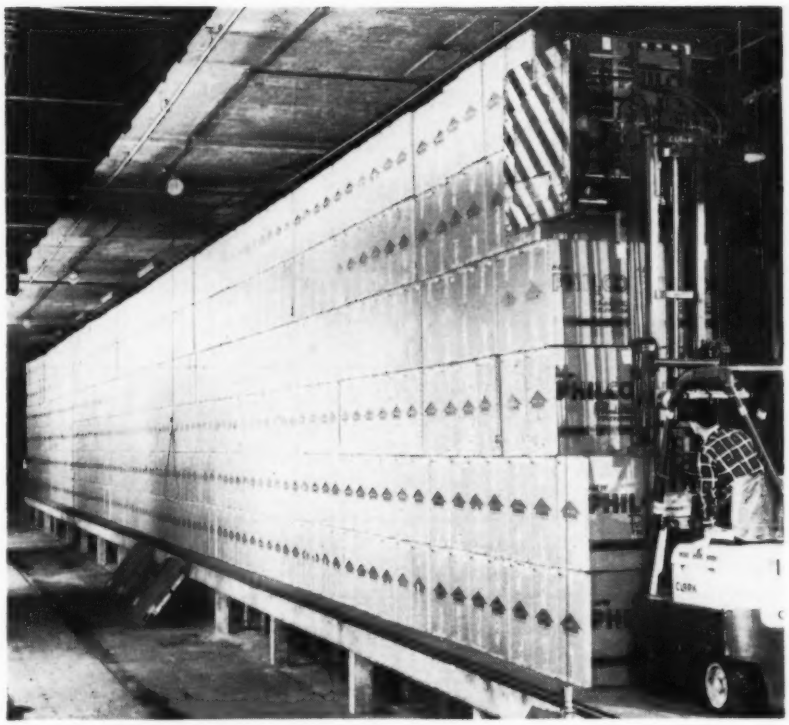
But to achieve its inventory goals, the auto industry will have to siphon off about 30 pct of the steel output in place of its normal 15 to 20 pct. This can only be done at the expense of other users.

Appliance Position—The appliance industry, for example, has had a good year. It expects next year to be even better. Sales of major home appliances—stoves, refrigerators, laundry equipment, etc., are up 20 pct over 1958. The sales outlook is for a 5 to 10 pct increase in 1960.

But appliancemakers must compete with automakers for sheet steel. Conversion deals have already been written covering delivery through the second quarter. Few producers expect to be able to rebuild inventories before late in the third quarter.

Farm Equipment Too — Farm equipment makers consider the first quarter to be the critical period for them. Bars, plate and structurals will be tight because mills have to go through their rolling cycles before repeating an individual size or special shape. And these are the items in greatest demand for the spring manufacturing cycles. Most companies don't expect to achieve a normal, balanced inventory before the third quarter.

Construction Outlook — While housing starts are expected to be fewer in 1960, industrial expansion is expected to be greater. The plate and structural products that feed this industry must compete with more profitable items for space in rolling schedules.



NO LET-UP: Appliancemakers look for sales to go up another 5 to 10 pct next year on top of this year's 20 pct increase. Philco Corp. photo.

Dravo Corp., which makes steel mill equipment, tow boats and barges, is one of the largest plate users in Pittsburgh. At the start of December, inventories were down to one-third of normal.

Nonferrous Easier—Demand for steel also brings demands for other metals. But here the situation isn't critical. Inventories of aluminum are high. And despite a strike in the copper industry, stocks of copper and brass are adequate.

Aluminum users are expected to liquidate stocks, builtup in anticipation of a strike that didn't come, in the first quarter of 1960. This will be followed by a brief period of inventory stability. In the spring, rebuilding will begin again.

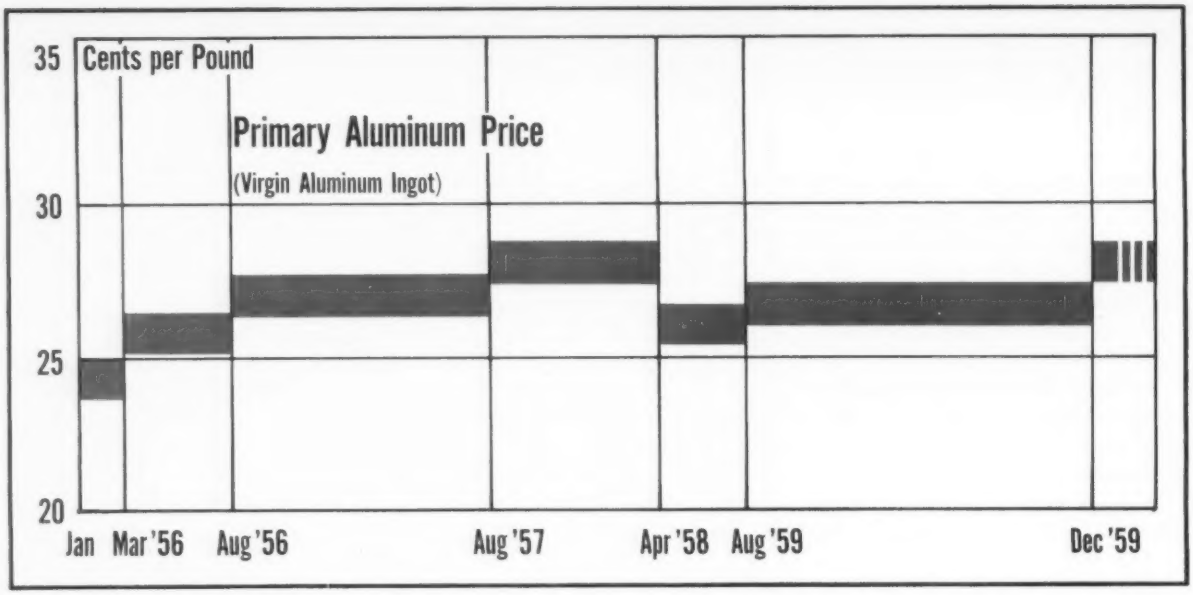
"If conditions are favorable, the buildup should be substantial," says E. M. Strauss, Jr., manager, commercial research division, Aluminum Co. of America.

However, the net effect of cutbacks and buildup may be to leave aluminum users with slightly less material at the end of 1960 than at the beginning. Alcoa expects aluminum shipments to rise 15 to 20 pct over this year, and for consumption to rise even more.

Copper and Brass—Copper and brass fabricators also loaded up on materials early this year in anticipation of a strike. The strike came and is still partially in effect. But the flow of copper was never completely shutoff.

Many mills say their stocks of copper are down about as low as they care to see them. And demand for copper is tied closely to demand for steel. Anticipating a heavy demand for steel, many mills have been building stocks of semi-finished products. They feel this will give them adequate time to rebuild material stocks once a full labor settlement is reached with copper producers. This is expected early in January. Then stockpile rebuilding should begin.

There seems to be little doubt that metalworking would like to rebuild inventories as rapidly as possible in 1960.



ALUMINUM PRICE: The price hike initiated by Alcoa puts the aluminum price where it was two years ago.

Aluminum Recovers 1957 Price

Alcoa initiates primary price hike of 1.3¢ per lb. Others follow.

Only surprise is that the hike came before new labor contracts were signed.

▪ The hike in primary aluminum prices, initiated by Aluminum Co. of America late last week, brought a wide range of reactions, but little surprise.

As expected, the price of primary aluminum was increased 1.3¢ per lb effective Dec. 17. All major producers, including Aluminium Ltd., the Canadian company, followed. This boosts aluminum to the level it was until April 1958 when Canadian pressure and soft markets forced it down by 2¢ per lb.

The announcement of new labor contracts in the industry was made two days later. For the full story see page 84.

Question of Timing—The only element of surprise is the timing. It was expected that the producers would wait until after they signed new contracts wih the United Steelworkers and the Aluminum Workers.

An aluminum extruder, however, says he wasn't particularly surprised. He notes that Frank L. Magee, Alcoa president, emphasized that the higher price "does not reflect the inflationary spiral of recent years." The Alcoa chief executive also said that it did not reflect the increased employment costs of more than 25¢ per employee per hour that the company had had since August 1957. Nor does it reflect the increased labor costs that new labor contracts call for.

Labor Implication — Several sources suggest that making the price move before the new contract lets the producers classify the new contracts as noninflationary. And it leaves the door open for another hike later in 1960.

The producers also announced that aluminum mill products would be adjusted "in varying amounts." Alcoa said its new price sheets wouldn't be ready for about a week after the primary hike.

An Alcoa source notes that "market conditions" are being considered in moving mill products. This means that sharply competitive items, such as soft extrusions, would be increased less than the 1.3¢.

Early this week rumors were flowing freely as to what the increases would be in various items.

Extruders Unhappy — Extruders were generally unhappy because some of their "advance information" was that extrusions would go up only .8¢ per lb, compared to 1.3¢ for pig. Soft extrusion billets will not increase as much as pig, but just how much was uncertain.

The reaction in the trade was what might have been expected. In addition to the extruders, some warehousemen were unhappy. They have fair stocks of metal paid for at the lower price. But they have been the ones hardest hit by imports.

Secondary ingot makers were generally satisfied. They say the market is strong enough.

Will It Be Sinter or Pellets?

Pellets May Revolutionize Blast Furnace Charging

Use of taconite pellets as blast furnace charge brings dramatic boost in tonnage.

Success of the Armco test results in more study, review of plans for new sintering lines. —By G. J. McManus.

▪ Pellets seem ready to challenge sintered ore as the best blast furnace charge.

Plans for agglomeration of iron ore are being reviewed in the light of dramatic results obtained with pellets in at least one blast furnace.

Until recently the thinking seemed to be that low grade ores should be concentrated and pelletized. The fines of high grade ores seemed best handled by sintering at mill sites.

Tonnage Boost—In May of this year, Armco Steel at Middletown, O. ran a blast furnace with a charge largely of taconite pellets. Pellets came from Reserve Mining Co., owned jointly by Armco and Republic Steel. The furnace averaged close to 2700 tons of iron a day over a month's time. For shorter stretches, it is said to have hit around 2800 tons a day.

These figures represent a jump of 300 to 400 tons a day over the very best furnace outputs with sinter. They are 700 to 800 tons a day over what is considered good blast furnace production.

Plans Revised—Armco has volunteered few details on the Middletown operation and it is too soon for a full evaluation of either sinter or pellets. But enough has happened to send steelmakers scurrying back to their drawing boards.

One major producer is now running crash tests of the pellets on a big volume basis. Preparation of ore is being handled by an independent supplier. This is expensive but the mill must decide soon whether a new ore field will go to sinter or pellets.

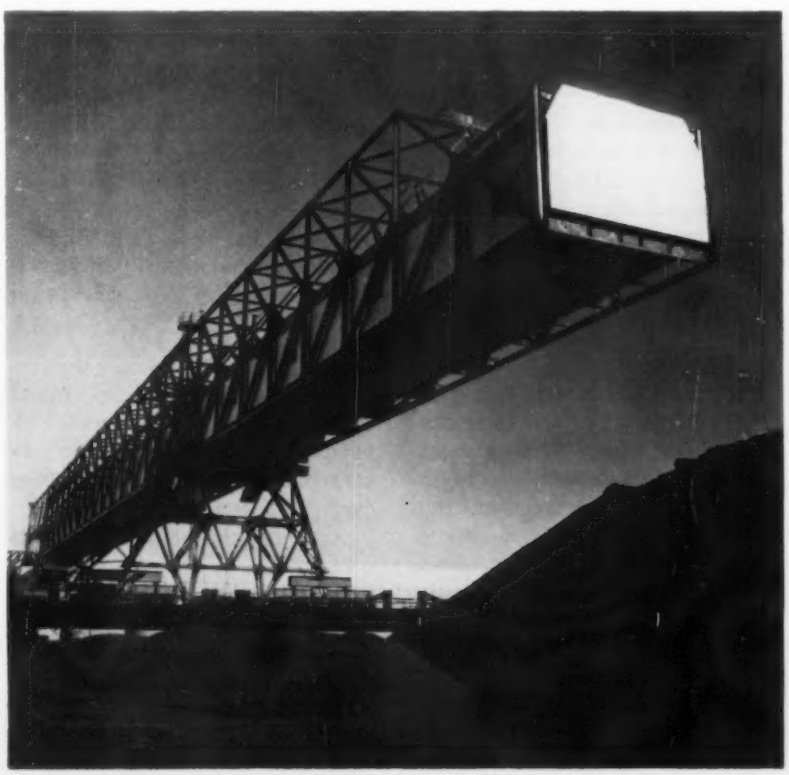
Other mills are inquiring into means of improving sintering plants or even converting plants to pelletizing. New construction of sintering lines has slowed to a walk.

Pellet Advantages — Advantages cited for the pellets include porous structure and uniform chemical makeup. Pellets are formed from very fine particles—they can be fused at relatively low temperatures. The higher temperatures of sintering tend to melt material and form a glaze over the surface. This condition acts against rapid reduction of sinter in the blast furnace.

Pelletizers have reportedly been able to get a high degree of uniformity in their product. In addition, pellets have the basic advantage of higher Fe content than most sinter —about 63 pct to 59 pct.

Sintering's Side — However, sintering men say the final word has yet to be said. They point out that many of the big sintering lines are still in shakedown stages. Use of air cooling, sizing equipment, precise temperature control and other devices will reduce or eliminate the advantage of pellets, say some.

Touchy Problem—All of which adds up to a situation with sticky implications. The big mills are heavily committed to sintering programs. Over the past six years, steelmakers have installed 26 major lines, upped capacity more than 30 million tons. Three more plants are being built.



STOCKPILE: Pellets are stockpiled for later shipping to furnaces.

MAGNESIUM: Dow Chemical Co. is counting on profits from primary magnesium, but also works other metals.

Recession Jolted Mag Progress

Dow Chemical, U. S. magnesium pioneer, has branched out into other metals.

Principal reason is to keep facilities operating until magnesium fulfills its sales goals. —By F. J. Starin.

▪ The recent decision of Dow Chemical Co. to branch out into rolling zinc and aluminum has deeper significance.

It points out that the timetable for commercial magnesium, which Dow pioneered in this country, has lagged behind the company's hopes and expectations.

Still Confident—Dow, for a long time was the only U. S. producer of the metal. The company still has confidence magnesium eventually will be a profitable product. But the current move to branch out into other metals has the prime objective "to have our facilities gainfully employed."

Dow has created a Dow Metals Products Co., splitting it from its Magnesium Dept. The new company will "work with any metal that shows promise of increasing its earnings." The mission is twofold in its overall scope.

The Objectives—"Dow is now in a better position to develop the diecasting market, particularly for automotive," says a Dow spokesman.

"And this market is the one that could most readily provide the volume consumption that would lift magnesium into the high tonnage class. At the same time, by branching into other metals, Dow's own metalworking facilities and know-how will be more fully utilized, opening up the possibility that Dow may become a significant factor in other metals."

To Use Facilities—The Dow corporate move was made without benefit of any formal market surveys, and without any specific percentage of the market or tonnage goals.

Actually, the impetus for the corporate move started building up in the recession of late 1957 and 1958. Magnesium's steady growth was severely jarred because many of the magnesium fabricators were small companies that had to cut back sharply. And indications then were that the road back would be hard. Few, if any, of these small fabricators had the cash to put into market development without getting a pretty quick return.

Excess Capacity—"Dow undertook the semi-fabrication and fabrication of magnesium originally out of necessity as a means of selling magnesium ingot," says the Dow spokesman. "Over the years, our metalworking facilities were used almost exclusively for magnesium.

"However, to do a good aggressive job, you have to have a lot of equipment, and the capacity of (Dow's) equipment considerably exceeds the demand in magnesium semi-fabrication and fabrication."

The History—Dow's initial venture out of magnesium was in 1951, when it started to do some aluminum diecasting. In 1957, Dow's big 13,200-ton extrusion press was called on to make aluminum wing panels for the B-52 airplane.

The company wasted little or no time getting into gear. Dow Metal Products is now rolling thin gage zinc sheets at its Madison, Ill., rolling mills from 8000 lb slabs.

And the company has set up a special aluminum mill products sales group.

Steel Issue Heads for NLRB Vote

Current moves are only the first election steps in advance of "last offer" voting.

Steel negotiators face tough, hard attacks on them and the industry. — By Tom Campbell.

▪ Renewed action in the steel hassle before the "last offer" elections is windowdressing. A voluntary agreement before that time is improbable. And the chances of one after the election are remote.

The steel companies have made their last offer. When they appear before the Taft-Hartley presidential board on Dec. 28, that will be clear. Anything more costly than what has been offered is out of the question—unless it is mandated agreement.

Union's Position—The Steelworkers' Union can hardly stand still for less than it has wrung from Kaiser Steel, copper companies, and the aluminum industry.

The steel industry wants an election. Companies claim steelworkers never had their say on their unions' actions in calling a strike. The outlay of TV, radio and advertisements before the election takes place can only be called colossal.

All Stops Out — Union officials will engineer just as big a campaign. All stops have been pulled out. Present negotiators and those in charge of the steel industry campaign haven't seen anything yet. They are not used to what is coming in the way of union propaganda. In fact, it has been years since the union has uncorked such brass-knuckle, last-ditch accusations, counter attacks and pressure.

The Federal Mediation Service will try to do something before the T-H panel meets. But it is doomed to failure. The steel side had made it plain for months that it is less than enthusiastic over anything the Mediation Service has done—or will do. This is unusual, because the Mediation Service represents the President.

Election Schedule—Elections on the last offer of the companies will be held the week of Jan. 11. The results will be known by the 14th or 15th of January. More than 500 NLRB employees will be involved in the mechanics of the elections. Five hundred company and 500 union watchers will be on hand.

Unless there is a change, leading steel men will be on TV and radio in different areas. Roger M. Blough, U. S. Steel chairman, is scheduled to be TV about Jan. 11.

Government Pressure—After the election, the government will pull out all stops and put on the heaviest pressure yet. This may take the course of an outright recommendation by Joseph F. Finnegan, Federal mediation director. Although Mr. Finnegan has made hundreds of recommendations since last July, he has made none public. He is quite savvy on the whole hassle. By law, he can make a recommendation for a settlement. This he may do.

Best guess on outcome is: There is an even chance of a short strike but that may even fade. Mr. McDonald will not call the men out again if the President appoints a fact-finding board. He will only resume the union's strike if the board's recommendations (if there is to be a board)—are turned down.

Congress will probably see to it before Jan. 26 that Ike will have the power to name his own board. No compulsory arbitration is in the picture yet. That would come with a paralyzing strike after all other modest attempts at settlement have gone to the ashcan.

Strategic Dates in Steel Labor

Dec. 21: This was the beginning of meetings early this week to have some face saving conferences on the record when the President returned. No settlement or progress looked for.

Dec. 28: This is the beginning of the T-H panel meetings where both sides will present their last stand—and offer. It will be routine, with some flareups for propaganda purposes. No progress expected.

Jan. 6: The panel report goes to the President. No unusual recommendations will accompany the report.

Jan. 11: Start of the nationwide elections. Employees will vote for or against the companies' "last offer." Or, for or against the union is the practical way of saying it.

Jan. 11: Roger M. Blough goes on television unless plans are changed as to his speech or the date.

Jan. 14 or 15: Outcome of the elections will be known. Officially, they will not be certified until Jan. 21 or later.

Jan. 26: If no agreement or congressional action, injunction will be vacated by attorney general.

Jan. 27: New strike unless Mr. McDonald holds it off to see what Congress will do.

All of the above presumes no voluntary settlement.

Close Look at Why Buyers Buy

By getting at the buyer's hidden motives, new study throws more light on industrial purchasing.

Motivation research reveals buyer's attitudes toward seller, opinions on what makes a superior salesman.

▪ The sale is made. But not always does the order go to the company with the best price, the fastest delivery, or the most service. Why?

A new technique—motivation research—probes into the buyer's mind to find the real reasons why the sale was made or lost. It brings to light the deep ideas, feelings, attitudes, desires, and dislikes that really make up the buyer's mind.

Off With the Old—A buyer may say, for example, that he thinks it better to stay with old suppliers. But when questioned indirectly he may be neutral about these influences. Or he may actually feel the company is due for a change in suppliers. He is probably willing to listen to, and encourage, a new salesman.

Until now, motivation research has been used with great effect in the advertising and selling of consumer goods. And it was tinged with Madison Ave. associations.

How It's Done—But a new study by the Industrial Advertising Research Institute applies it constructively to industrial buying. Interviews were conducted with 58 industrial buying influences in 24 companies. Included among those questioned were purchasing agents, engineers, and production and management personnel.

The study brings out the information and image attitudes that direct questioning doesn't reach. It adds to an understanding of the real factors that decide industrial buying. And it helps an individual company find out why purchasers buy or do not buy.

Questioning reveals that buyers generally have more favorable attitudes toward sellers than unfavorable ones. But indirect questioning shows there are definite images of the selling company in the buyer's mind. He is concerned with whether the seller is interested in his problems.

What Counts Most—On the surface, buyers list delivery and price as important buying influences. But when interviewers probe deeper, the buyers indicate price and delivery are not as important as they maintained.

When first asked, purchasers state product quality and supplier performance are critical buying factors. But their real attitudes show price is even more critical.

What the Industrial Buyer Really Thinks

Motivation research drew some sharp answers from buyers about supplier relations. Here are opinions, brought to light through indirect interviewing:

On Supplier Attitudes—"While business was good, this manufacturer didn't want to work with us. When things are slow, they are back trying to sell us."

"This supplier is alert. I know the salesmen call on production managers regularly, can smell out business. Dependable even when the product is tight. They usually keep their promises."

On Loyalty—"I feel that loyalty because of fair price and good product and service pays off. But blind loyalty without looking to see what others have is looking for trouble."

"We aren't loyal to the point of being foolish. But we think twice before switching because we want suppliers to have some incentive to give us service and delivery when we're in a tight spot."

On Location—"In some cases it's a lot easier for us to call the factory, the average salesman isn't technically qualified."

"It's important to have a sales office nearby so that we can call our orders in easily. Warehouses are important, too. Both Co. A and Co. B have regional warehouses which give us overnight delivery."

About Salesmen—"When you're selling a commodity on a repeat basis, you have to ingratiate yourself. You can't be aggressive or a go-getter. You'll drive me nuts. . . . They (the salesmen) should be cool, well-qualified technically. . . ."

"He is the best man who ever called on me. He comes in and gets the time of day over in a hurry. Gets down to cases right away. Gives the facts on price, etc., quickly. Doesn't try to snow you under with a complete line of stuff. Shows you what you need."

Superficially, the buyers have no special preference about the size of suppliers. But subconsciously, they lean toward the larger supplier. The smaller supplier has more trouble convincing the buyer he can offer as much assistance.

Is Location Important?—Initially, only a third of those interviewed said the supplier's location has any influence. The service the seller provides is most important. But the depth interviewing shows buyers tend to connect service with the nearness of the supplier.

In direct questioning, "experience" topped the list of qualities needed by superior salesmen.

Emphasis on Service—Speed was mentioned most often when those surveyed were asked about the most vital factors of supplier service. In MR study they were given a list and asked to pick the adjectives applying to a good supplier. "Dependable," "reliable," and "experienced" were chosen more often than "promptness."

The Buyer's Mind—Buyers possess strong personality traits which can make—or break—a sale. About 9 out of 10 of those interviewed revealed one or more of these traits which would influence the sale.

These traits include: The superiority phobia—a fear to express ideas and disagree with superiors; a lack of open-mindedness; a lack of aggressiveness and cooperation; being unduly influenced by associates; a chip-on-the-shoulder attitude; lack of knowledge, which leads to prejudging products.

Based on what the study shows, what can a company do to improve its marketing? Some specific suggestions are offered in the form of direct questions.

The study asks: Does your marketing "sell" your company as well as its products? Does it emphasize a variety of reasons for buying the product? Does it help purchasers sell others who influence purchasing? Does it reassure the decision-maker that he has made the right buy?

House Will Consider LIFO Relief Bill

Bill introduced last spring is similar to one that provided LIFO relief during Korean War.

But this one would become a permanent part of the Revenue Act.—By K. W. Bennett.

■ All hope of recovering losses on LIFO inventory hasn't been lost. House Resolution 6014, introduced last March by Noah Mason (R., Ill.), is in the Ways and Means Committee of the House.

It would extend the allowable inventory buildup period, to reach LIFO base, in the same manner that Congressional action offered LIFO relief during the Korean War.

Early Consideration—H. R. 6014 is gaining strength. It's reported to have Administration backing.

The bill's long wait in committee is no indication that it is a dead issue, Washington observers report. It's early appearance, before a steel strike was even regarded as probable, resulted in the bill's being bypassed as the committee acted on more urgent legislation. However, it's now expected to move onto the House floor before tax time.

Previous LIFO Relief—In its initial form, the bill is much like the Korean period LIFO relief legislation. A bill in effect at that time, covering "involuntary liquidation" of inventory, allowed corporations using LIFO accounting systems to extend their inventory buildup beyond the usual fiscal or calendar year.

The Korean act was in force from June 30, 1950, to January 1, 1955. It expired and, as inventory buildup was no longer a problem, the act was not renewed.

New Twist—The new resolution offers an additional twist. In its present form, the bill would become a permanent addition to the Revenue act. Rather than expiring with the end of the current steel shortage, the act would remain on the books in an inactive status. A new emergency would bring the law back to life, without need for new legislation.

What will be the effect of a permanent safety valve for LIFO? A survey of 600 of the largest U. S. corporations indicates that one-third use a LIFO inventory accounting system. A check of steel service centers indicates that at least 40 pct use LIFO (IRON AGE, Nov. 5, 1959, P. 52.)

Switch to LIFO?—It's regarded as likely that passage of the Mason bill would again boost the rate of gain in the number of firms using LIFO accounting. The comptroller of one major metalworking corporation comments: "We have two men studying the system. We didn't adopt it simply because of what's happening right now. We feared a steel shortage in a period when there was no Congressional relief provided in extending the period in which we would be allowed to rebuild our inventories to the LIFO base level. It's too bad. While we've been waiting, we figure we've lost millions in savings we would have made if we were on a LIFO accounting system."

Noah's Ark—When the Mason bill was introduced, it was called a fiscal "Noah's Ark with no rain in sight." That was in March.

Congressman Mason told The IRON AGE, "We're getting letters from all areas in the United States, calling for action." Commented a steel service center official, "Good, and we hope they get a whole lot more."

Doctoring Up a Miniature Bearing

INJECTION: Resident Engineer Robert Pierson oil lubricates a miniature precision bearing with a special hypodermic. The operation is done in the recently opened laboratory at the Los Angeles headquarters of Miniature Precision Bearings, Inc.

Passenger Car Output Highest Since 1957

Production of passenger cars in U. S. plants is scheduled at 150,000 units this week. It is the highest total since the week ending Nov. 22, 1957. The heavy flow follows a long siege of low production caused by steel shortages, particularly at General Motors and Chrysler Corp. Earlier efforts this month, for example, were 55,000 units the week ending Dec. 5, and 86,000 last week.

Responsible for this week's outburst is General Motors. For the first time since October, its assembly plants are in full operation. Chevrolet is spearheading the comeback. The division is programming 47,000 cars this week, biggest weekly total in its history.

Some Difficulties—But not all companies are problem free. Chrysler Corp. isn't in full production. Some of its plants are working only three days. And American Motors, which had been racing along at a six day weekly pace, relaxed a bit to five and a half days this week because of parts problems.

The holidays will cut into production the next two weeks. Output around the 100,000 level is looked for. Most assembly lines will run only three and a half days each week. December's total still looks like 450,000 units. A rise to 700,000 is in the books for January. Output in 1959 through this week: 5,375,000, a year ago: 4,069,000.

Largest Ore Boat To Be Launched

The largest and most powerful ore boat ever built for the Great Lakes iron ore trade, the Edward L. Ryerson, will be launched Jan. 21.

Made for Inland Steel Co. and built by Manitowoc Shipbuilding, Inc., it will have an overall length of 730 ft and a beam of 75 ft. These are maximum dimensions allowed by Great Lakes locks and channels.

The boat will only be able to carry a full ore load after present deepining programs between the lakes are completed. Fully laden, the boat will carry 27,000 gross tons. At present, loads are restricted to 22,379 tons.

New Institute Formed

The American Powder Metallurgy Institute has been formed by the Metal Powders Industries Federation.

A technological division of the Federation, the Institute had previously been restricted to corporate membership. But increased interest in the field and greater numbers of people engaged in using powdered metals caused Federation directors to open the Institute to individuals.

Local Activity—Membership is now open to anyone having a bona fide interest in the field. A program of local section activity is being planned to provide meetings and speakers and to develop interest in powder metallurgy on the local level.

The Federation will hold its 16th annual meeting April 25-27, 1960.

Navy Awards Contract

A $73 million contract for more A3J aircraft and associated equipment has been signed by the Navy and North American Aviation, Inc., Columbus Div.

The contract covers production of the Vigilante during 1961. It includes aircraft, spare parts and special support equipment. The latest order on the Vigilante makes more than $300 million the Navy has spent on the advanced weapons system.

"WEIRKOTE'S® SOMETHING SPECIAL! IT CAN END THE NEED FOR ANY FURTHER CORROSION PROTECTION AFTER FABRICATION."

Q. You mean it? Weirkote can save you the cost of any further processing for corrosion protection after fabrication?

A. Absolutely. It's the continuous process that does it. Integrates the zinc to the steel so tightly there's never any peeling or flaking. No matter how severe the fabrication—any torture test you put it through—that bond stays put!

Q. Hmmm. Weirkote sounds great. One thing—is its zinc coating uniform throughout?

A. To the nth degree! Even the hardest-to-reach areas on the most complicated fabrications are completely protected.

Q. Corrosion-protected, you mean?

A. Corrosion-protected all over! So much so that you can work Weirkote to the very limits of the steel itself. So there you have it: stepped-up manufacturing efficiency, sharply curtailed manufacturing costs. All from Weirkote!

Send for free booklet that details the time-and-cost-saving advantages of skin-tight zinc-coated Weirkote. Just write Weirton Steel Company, Dept. A-1, Weirton, West Virginia.

WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

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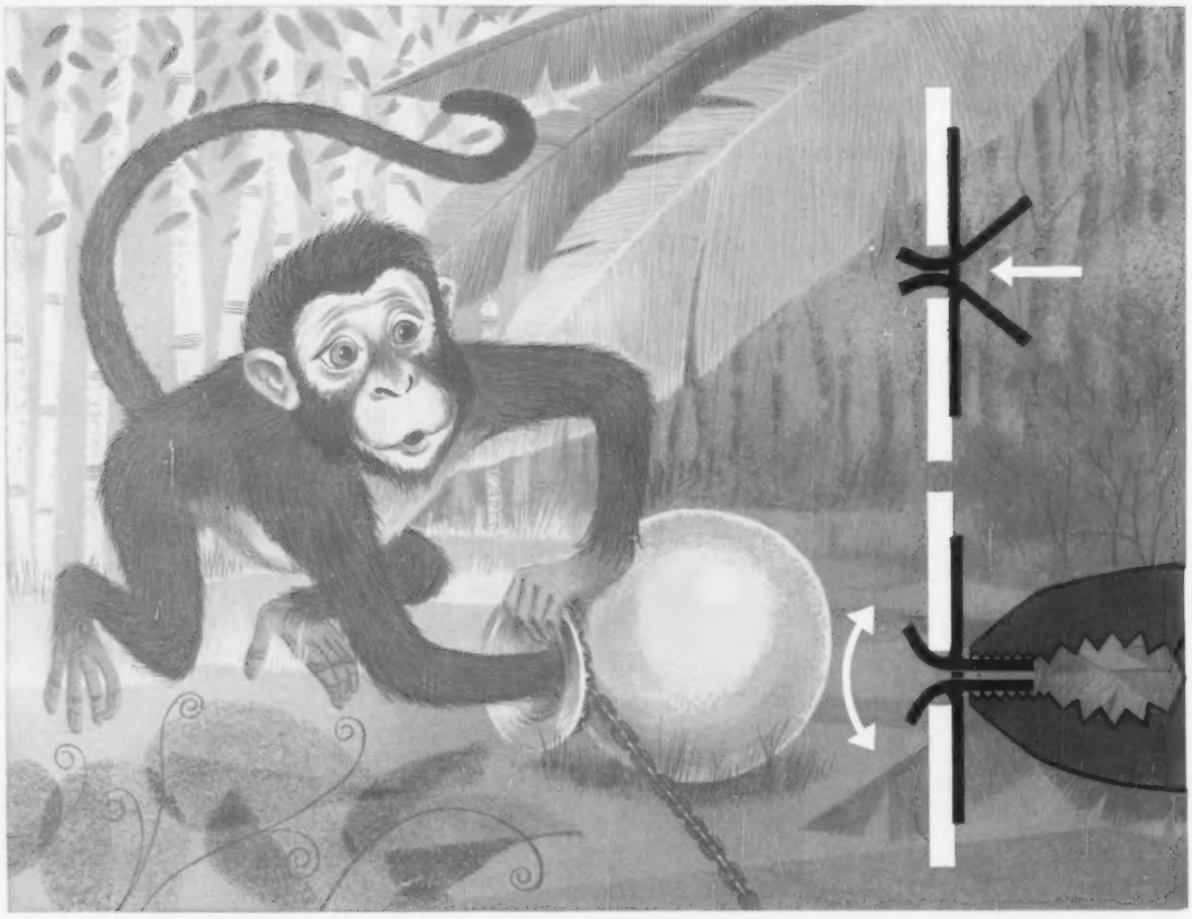

TRAPPED BY A GRIP THAT WON'T LET GO!

See how Tinnerman "pinch-grips" hold front-mounting attachments; no special equipment needed

Typical of Tinnerman *new approaches to old problems* are "pinch-grip" SPEED CLIPS—permitting front-of-panel applications in a second's time. SPEED CLIPS are simply inserted into mounting holes and a plier's pinch gives permanent retention.

SPEED CLIPS can increase production rates, eliminate rejects, cut assembly costs as much as 50%. Many different features may be incorporated in the SPEED CLIP design to fasten cables, wire harness, rubber feet, mouldings, and for scores of other assemblies.

You may have a fastening problem that can be solved—or a product which can be improved—by this SPEED CLIP principle. Your Tinnerman specialist (see the Yellow Pages) can furnish samples and help you in many ways. Or write:

TINNERMAN PRODUCTS, INC.
Dept. 12 • P.O. Box 6688 • Cleveland 1, Ohio

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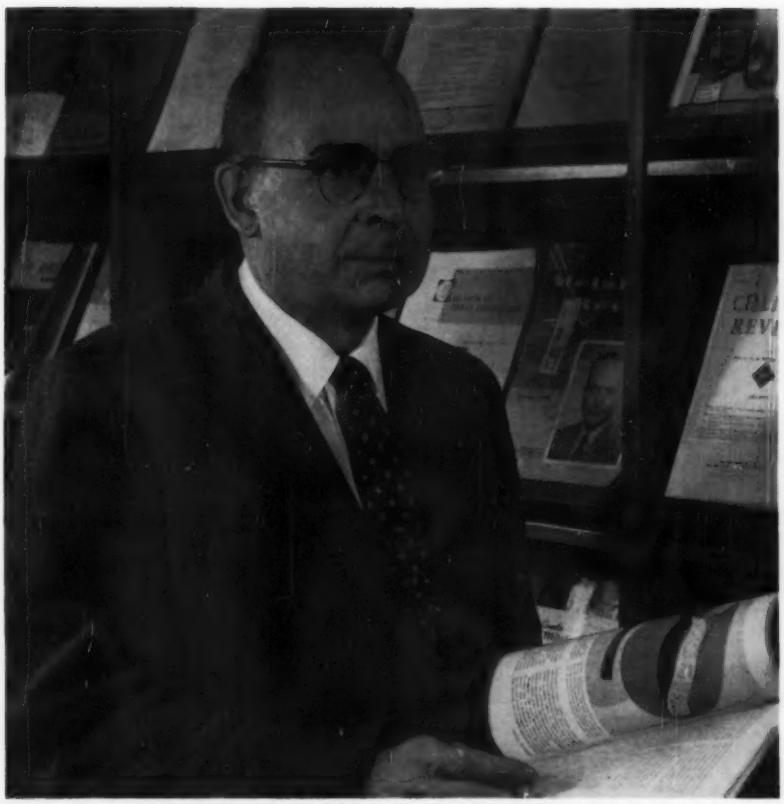
Walter Crafts

A Crusader for More Research

The American Society for Metals new president believes that research should never stand still.

He is working to improve research techniques in the society. A research prizewinner, he knows how it's done.



WALTER CRAFTS: Making sure research doesn't stand still.

■ If the American Society for Metals wanted a crusader for more research, they found the right man in their newly installed president, Walter Crafts.

Laying out and keeping tabs on a host of big competitive research jobs for industry, is familiar ground to him. This is his principal duty these days as associate director of technology for Union Carbide Metals Co. at Niagara Falls, N. Y. There he is one of the administrative leaders for a 650-employe research lab.

Always Progress—But his major concern as ASM president is making sure that research does not stand still—that the right material must be forthcoming for the unprecedented designs being laid out. This is his primary theme in addressing his fellow ASM members—that the speeded-up rate of scientific breakthroughs in design needs a metal with a new combustion of properties.

These are the immediate frontiers for metallurgists. And the ASM under Mr. Crafts will be in the forefront with new programs like expanded study programs, electronic literature searching, updated and expanded technical manuals and grants to promising students.

Prize Winner — At Union Carbide, Mr. Crafts and his associate Don Hilty several years ago did pioneering work on oxygen blowing in electric furnace production of stainless steel. It was good enough to win the 1955 Francis L. Toy prize of the American Institute of Mining, Metallurgical and Petroleum Engineers and many of its precepts are standard practice now.

The program has been carried further by Mr. Crafts into a computer center to determine the most efficient way of using raw materials in stainless production.

Active Member—Mr. Crafts has been in metallurgy for just about his entire professional career. He was graduated from Yale in 1924 with an A.B. degree and two years later earned an M.S. from Massachusetts Institute of Technology. He started as a metallurgist with a steel mill at Chicago and three years later joined the Union Carbon and Carbide Research Laboratories on Long Island, N. Y., as a research metallurgist. In five years he became a steel research group leader and 12 years later became chief metallurgist. In 1952 he was appointed to his present post.

In the last 4-5 years the bulk of his time has been devoted to ASM matters. After the death of the managing director, Wm. Eisenmann, he devoted himself wholeheartedly to contact work with local chapters.

PRECISE GAUGE CONTROL

to your restricted specifications with

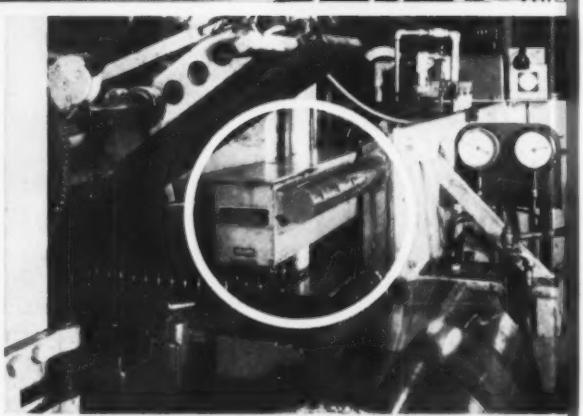
J&L Cold Rolled Strip Steels

In many critical applications, precise gauge control yields worthwhile savings on production costs. Not only does it mean increased tool life but it eliminates grinding for gauge accuracy and reduces quality control costs by minimizing inspection schedules.

At J&L, specially designed cold mills make it possible to exercise precise gauge control — to your specifications. J&L processing techniques include the use of AccuRay gauges to provide exact measurements during rolling. Gauge accuracy is just one of the many restricted specifications which can be met consistently by J&L.

J&L offers you an experienced organization devoted to strip steel processing combined with fully integrated production facilities.

For your convenience, precision strip facilities are available to you in our plants at Youngstown, Indianapolis, Los Angeles and Kenilworth (N. J.)



Typical of J&L precise control is this AccuRay thickness gauge to help assure tolerances on cold rolled strip steels.

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Output Starts Toward New High

With business reviving quickly from its third quarter decline, industrial output is soaring.

It should reach a new all-time record within the next six or eight months.

▪ The economy has come back fast from its third quarter slump. And from here on out (barring another steel shutdown) the recovery will pick up speed.

In November, the Federal Reserve Board's Index of Industrial Production edged back up to 149. This preliminary seasonally adjusted index was 1 point above October's revised figure. And a big climb is assured this month as industry gets rolling.

Back to the Top—By next March or April, the FRB index should again reach the previous all-time high—the record 155 set in June. From there it will probably climb to a new record, topping out at 160 during 1960. This new mark will be reached in the second or third quarter.

But last month the improvement was evident. Some, but not all, of the economic indicators revived. During November, steel operations rose to 60 pct of capacity. So far this month the mills are operating above 95 pct.

But the auto industry was at low ebb last month. Assembly line operations were still waiting on steel deliveries. There were also production cutbacks in metal fabricating industries.

November Gains—Other indicators were more encouraging. Personal income advanced. Sales, except for autos, soared to a new high. Sales increased at department stores and other retail outlets.

Bolstered by the return of workers in the steel and coal industries, employment also improved. The number employed in the service industries, state and local governments rose.

New Record GNP?—The Gross National Product for the fourth quarter should also show an increase. The dip of almost $6 billion in the third quarter was largely due to steel and other labor troubles.

One economist, Martin R. Gainsbrugh, of the National Industrial Conference Board, believes the "top is not yet in sight" on the economic upswing which began last April. He adds: "In 1960 the nation will turn out far more goods without straining its capacity or hitting the bottom of the labor barrel."

And he predicts an increase of at least 5 pct in the GNP.

Government Spending Changes

▪ This could be the time to sharpen your sales contacts with state and local governments.

The pattern of government spending is changing. Federal outlays probably won't keep pace with spending by the economy as a whole in the next few years. Defense budgets should level off, rather than increase.

Coming Shifts—There'll also be a change in the type of spending. Missiles and rockets will get more emphasis. Other types of military goods will get less. Defense contractors will need to review their markets in the light of these changes.

On the other hand, the markets for business with state and local governments will keep expanding. This is the trend to watch as the 1960's develop.

The Research Institute of America charts estimated governmental spending in its "Time Map of the Sixties." In the next ten years, defense spending may advance from $45 billion to $53 billion. Federal spending for non-defense items may increase from $10 billion to $16 billion.

Biggest Gains—But the greatest gains are predicted for spending by state and local governments. According to the Institute's estimates, this spending will rise from $52 billion to $84 billion.

Behind the rise, to a large extent, is the mushrooming growth of the suburbs. Spending for schools, roads, and recreation facilities will keep mounting.

Third Quarter Drop In Sales and Profits

Sales and earnings of U. S. manufacturers dipped in the third quarter. Most of the decline came from the reduced income of two groups —the steel industry and the automakers.

Aside from these two industries, manufacturing's sales and profits after taxes stayed about the same as in the previous quarter. And, for the first nine months of 1959, both were at all-time records.

BULLARD

"H.B.M., Model 75 is better than any other machine we've ever seen."

This statement by Mr. John Gruber, Plant Foreman of George Hantscho and Company, Inc., Mount Vernon, New York, manufacturers of printing equipment, sums up their experience since installing the Bullard 4" H.B.M., Model 75, in June 1957.

He further states "our presses and paperfolding machines are made to order and each job varies from the one before it. Because of this, we can't use assembly line or mass production techniques."

"The only mass production we have is the machining of holes in cast iron, up to as many as 105 in a side frame. Since we've been using our Bullard H.B.M., Model 75, with BULLARD AUTOMATIC POSITIONING we have not spoiled a single piece due to the malfunctioning of the machine."

Do you know the full story on the Bullard H.B.M., Model 75? If not, it will pay you to call your nearest Bullard Sales Engineer — he'll be glad to give you all the details or write

THE BULLARD COMPANY BRIDGEPORT 9, CONN.

A Realistic Look at Fuel Economy

Compromise Likely Between Economy and Luxury

You can't have 30 miles per gallon in a big car loaded with power packages.

Luxury items and economy just don't go together in car design.—By A. E. Fleming.

▪ Right now, with emphasis on the small cars, both imported and domestic, fuel economy is a hot automotive topic. But is it a craze like the horsepower race of a few years ago? Or is it a passing fancy like the gaudy, triple-color paint jobs of 1955?

There's some question whether car owners even want fuel economy, or even know what it is.

False Economy?—Everyone knows the driver who will go many miles out of his way to find a filling station where he can save a cent a gallon on his gasoline. This is often the same fellow whose car is glutted with gas-gulping, mechanical knick-knacks such as power steering, power brakes, and power this-and-that.

This is not a charge against such pieces of baggage. These items can be useful and many drivers would not be without them.

But for a person to load his car with them and then worry over the price of gasoline is something else. Maybe he's looking for a compromise between economy and convenience. But, as P. C. Ackerman, Chrysler's vice president, engineering, points out, "The customer has not expressed a great willingness to trade very much to help fuel economy."

Everything and Economy—This is a polite way of saying that the American idea of what an auto should be is a chariot loaded with power devices that can deliver top performance while not getting less than 30 miles to the gallon.

The size of the car doesn't matter too much. As a matter of fact, some companies are coming out next year with medium-size small cars for people who like their luxury in little packages.

But back to Mr. Ackerman. "Up to now," he explains, "the customer has showed a preference for features that trade fuel economy for driving convenience. Some people are willing to trade some convenience and size for better economy. However, the biggest share of the market is still interested in automatic transmissions, power steering, and all the other things that detract from fuel economy. The problem is to try to give the customer the car he desires and economy as well. To do this will be expensive. It costs money to save money, at least where fuel consumption is concerned."

Costly in the City—One of the main reasons for low gas mileage in city traffic is, of course, the automatic transmission. Its popularity has spurted in the last few years. In 1940, hardly anybody had it. Today it's going on more than three out of four new cars. It's even ordered on over half of the cars

Renault Reacts to Compacts

It's generally accepted that U. S. automakers introduced their new compact cars, among other reasons, to combat the inroads of imports on the domestic market.

Here is how a principal European automaker reacts to the move. Says Robert E. Valode, vice president and general manager, Renault, Inc., large French auto company:

"We at Renault firmly believe they will help us. They will help quicken motorists' interest in all economy cars. The more people read, hear, and talk about economy cars, the faster will be the growth of public recognition of their advantages."

In 1960, we confidently expect import sales to increase. Our consumer research convinces us that the popularity of the small imported car is no fad."

"Not all imported cars will share equally in the market. **Those destined to prosper are the ones offering nationwide sales and service facilities."**

"Our belief is that the compacts will not hurt the sales of Renault."

"In motor transportation . . . economy and convenience are paramount considerations. The small car supplies these specific requirements better than any compact or standard car."

in the low-price field. It's a feature people obviously like and don't mind paying for.

"How many realize, however," asks Mr. Ackerman, "that at the same time they agree to pay some $200 extra for the automatic transmission, they are also agreeing to sacrifice as much as 3 miles per gallon in fuel economy. And yet one payment is no less real than the other."

It's a Paradox—Power steering also takes its toll of gas mileage. It knocks off about a half mile per gallon. Air conditioning reduces mileage up to 1.5 miles a gallon. In fact, on a typical V-8, fuel economy penalties of power accessories can account for a reduction of up to 30 pct in city traffic economy. Still, people are buying all of these gas-consuming ornaments at greater and greater rates.

So here's the problem trying to give today's contradictory car buyer the accessories and performance he wants along with the economy he thinks he wants and loves to talk about.

What Can Be Done—But as Mr. Ackerman says, it costs money to save money. "To provide accessories, performance and economy all at the same time," he notes, "We must improve existing components and add new ones. We must find better ways to turn more of the energy in each gallon of gas into useful driving thrust at the wheels."

Mr. Ackerman says a number of things could be done to improve fuel economy. But every one of them would send car prices higher. The industry isn't convinced its customers are interested enough to pay the freight.

New Drive for Extras — Among the features that would provide improved economy, according to Mr. Ackerman, is a new type of drive for accessories. "Right now," he points out, "Because it's the cheapest and simplest way, things like the fan, water pump, generator, power steering pump and air conditioning compressor are driven by a belt directly from the engine crankshaft. As engine speed increases, so does the speed of every accessory.

"This is wasteful. Primarily, we want a generator to charge the battery at low engine speeds when we're moving slowly through traffic. We need our steering pump most when the engine is idling—during parking. We need the fan primarily when the car is slowly moving through traffic.

Costly, Too—"If we could use a variable speed accessory drive, or, better still, individually controlled drives for each accessory, we could reduce considerably the amount of fuel consumed by accessories. Unfortunately, such an accessory would be expensive.

Mr. Ackerman says the industry will continue to reduce the overall drive ratio, either through changes in rear axle gearing or in the transmission itself.

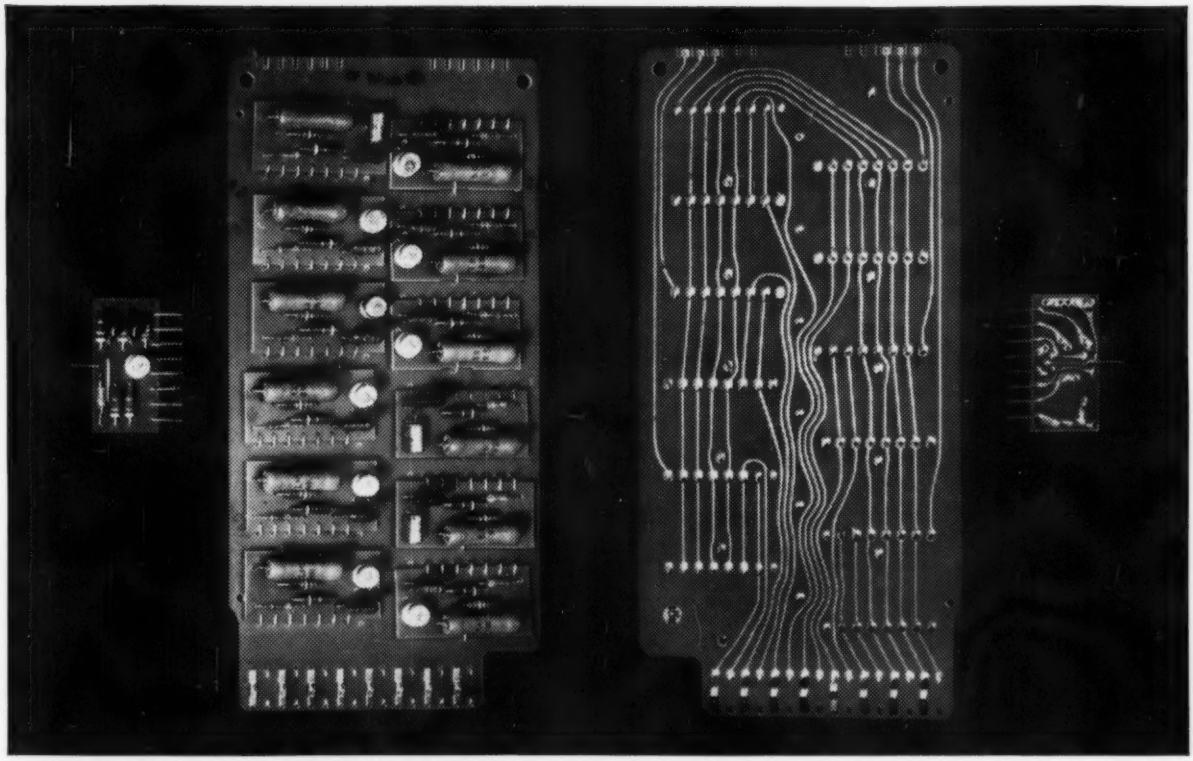
Some Ideas—Also coming in for their share of attention: Ways to improve ignition timing characteristics to combine peak performance with freedom from knock, improvements in fuels and lubricants, new tread materials and designs, new ways of constructing the tire, cleaner aerodynamic design to reduce air drag on superhighways, variable-speed drives, better automatic chokes, and thermostatically controlled warm-air intakes for improved warm-up economy.

The long-range picture for better economy is made up of bits and pieces—fractional improvements in economy that can be obtained without adding substantially to the prices of cars or taking away their conveniences.

Compromise Coming?—Yet the industry isn't neglecting the fact that American car buyers may pull a switch some day and accept the compromises which will lead to greater fuel economy. "To this end," says Mr. Ackerman, "we are working on cars with economy engines, special transmissions, and other experimental components. Some of these experiments promise economy gains of up to 25 pct, but with a loss of 20 to 30 pct in accelerating ability.

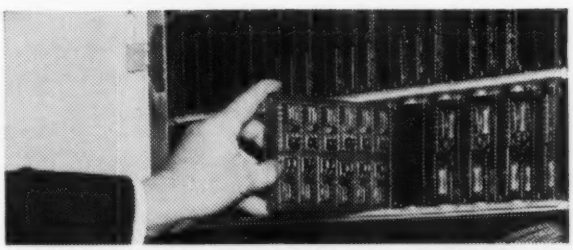
The Bull of the Woods

GOLLY, THAT'S SWELL WORK! JIST LIKE NICKEL PLATE!
HE'S A GONER! HE'S BEEN GOIN' WITH A GIRL FOR FOUR ER FIVE YEARS AN' THAT OFFICE KID HAS GOT TYPED ON THAT ORDER SHEET ALL SINGLE MEN WILL BE LAID OFF FIRST!
THE OLD FASHIONED SHOP KID PAINTED YOUR SHOES, PUT GREASE ON YOUR HANDLES AN' SUCH SIMPLE JOKES--BUT TH' JOKES ARE IMPROVIN' WITH EDUCATION--OR GETTIN' WORSE!
BLUE PRINT NO 2945
REPAIR ORDER
THE SPEEDER UP
© 1959 by NEA Service, Inc. T.M. Reg. U.S. Pat. Off.

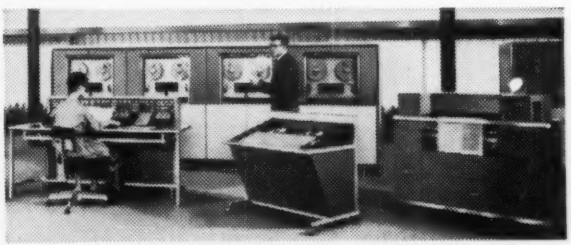


In the electronic logic elements of the RCA "501" data processing system, transistors and other small components are mounted on plastic wafers with printed-circuit wiring (small units right and left, above). The wafers, in turn, are mounted on thin plastic boards, also with printed circuits (center, above). This modular construction reduces size of the system by 75%, increases reliability, reduces maintenance.

PRINTED CIRCUITS OF COPPER AND ALL-TRANSISTOR DESIGN HELP MAKE 75% SIZE REDUCTION IN RCA DATA PROCESSOR



Modularized circuit elements are installed in the system by sliding them in place. Contacts on outside edge make possible quick checkout and testing without removing boards. Many thousands are used in each system.



The "501" is designed to handle paper work—bills, reports, payrolls, etc.—accurately, economically, and at extremely high speed. It serves businesses ranging from banks and utilities to steel mills.

With the growing importance of miniaturization and reliability in electronics and nucleonics, Anaconda electrical copper products take new and varied forms—find new and more sophisticated uses.

In the compact new all-transistor data processing system shown above, the printed circuits are etched from Anaconda "Electro-Sheet" copper foil. This is electrodeposited paper-thin copper with quality carefully controlled to meet NEMA specifications. Bright on one side, it has a matte finish on the other for a firm bond to the circuit board. "Electro-Sheet" is furnished in various thicknesses to exceptionally close tolerances.

In other fields, the growing need for compact electrical assemblies which can handle high current densities calls for hollow copper conductors for fluid cooling. And for new environmental conditions, more difficult application needs, there are new copper alloys.

METALLURGICAL ASSISTANCE. Whatever your problem in electrical conductors, Anaconda metallurgical specialists will gladly help you select the metal—and the form or shape—best suited to your needs. See your American Brass representative or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

5946

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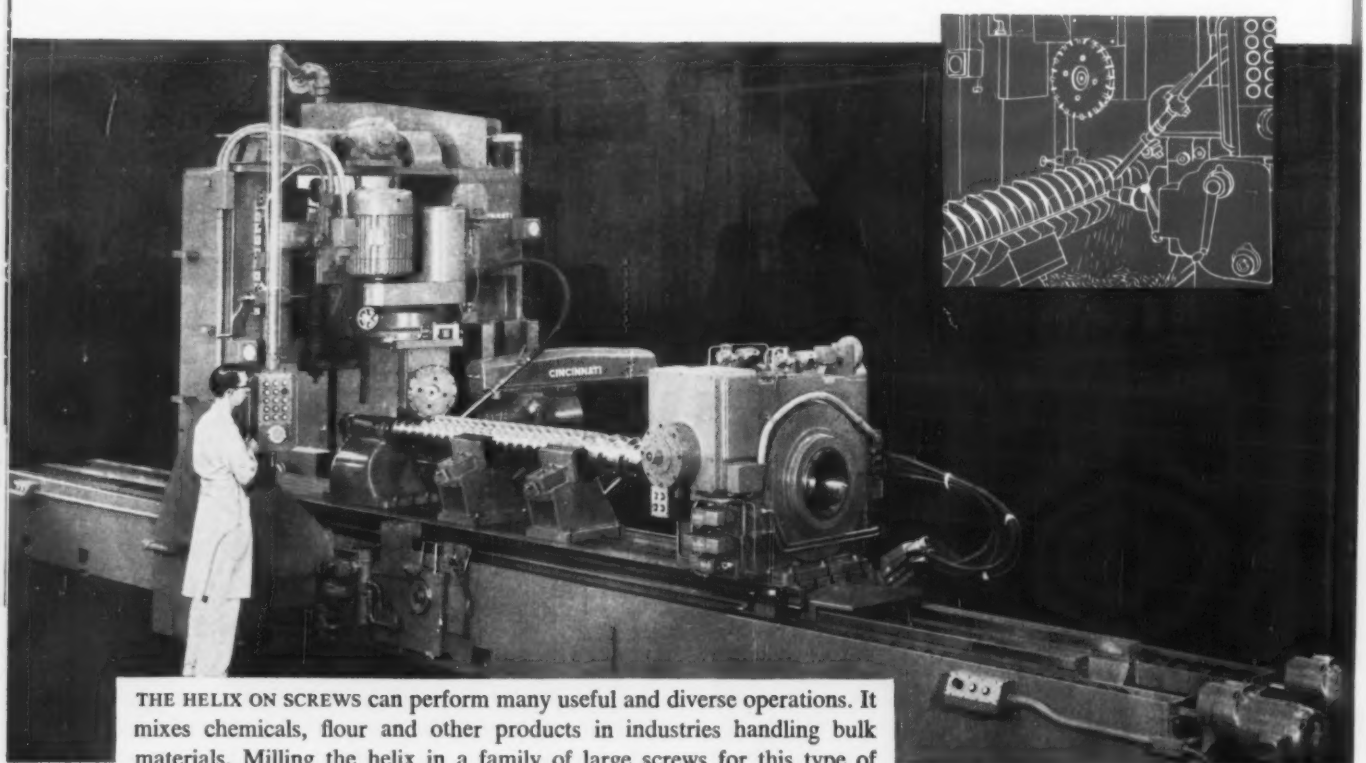
ELECTRICAL COPPER PRODUCTS

Made by The American Brass Company

CINCINNATI

CINCINNATI SPECIAL MACHINE DIVISION

incorporates Dependable Productivity in long *helix milling machine*



THE HELIX ON SCREWS can perform many useful and diverse operations. It mixes chemicals, flour and other products in industries handling bulk materials. Milling the helix in a family of large screws for this type of equipment proved to be too expensive for one machinery builder, so he enlisted the aid of Cincinnati Milling's Special Machine Division. Their specialists developed a machine having a conventional horizontal spindle (standard Hy-Powermatic unit) and a heavy duty 20 hp universal spindle head. The helix is roughed out by the large cutter above the part, and finished with the end mill in the conventional horizontal spindle. Cincinnati's unique Telephase control system operates the fixture rotation in exact relation to table travel, producing an unusual combination of highly accurate right- and left-hand leads.

Giant production lines; big machines having a high degree of "intelligence"; compact, single cycle machines... all are built by Cincinnati and are dependably operating in various plants, producing at the lowest possible cost. Our Field Engineers will be glad to show you what the Special Machine Division can do for you. **Special Machine Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**

Deep helix mixing screws, requiring four types of operations, are milled on this CINCINNATI *Special Helix Milling Machine. It has the capacity to handle any size screw from 4" to 24" diameter, up to 24 feet long. (Photo courtesy of Baker Perkins Inc., Saginaw, Mich.)*

SPECIAL MACHINES • COMPLETE PRODUCTION LINES
• VERTICAL AND HORIZONTAL BROACHING MACHINES

CINCINNAT
SPECIAL MACHINE DIVISIO

Tax Outlook Better for Business

General Tax Reform and Some Cuts Are Possible

A high rate of business this year could bring some tax cuts for 1961.

But business' best hopes lie in reform now being studied by Congress.—By G. H. Baker.

▪ Lower taxes, not in 1960, but in 1961, are a good possibility. It all depends upon the state of U. S. business activity in the year ahead. Healthy sales activity would stimulate tax collections and thus open the door to cuts.

Chairman Wilbur D. Mills, D., Ark., of the tax-writing House Ways and Means Committee, (See The IRON AGE, Dec. 10, P. 61) is paving the way to long-overdue tax reform via the public hearings he's holding in 1959 and 1960.

Weaknesses Show—Congressmen Mills is deliberately spotlighting such flaws in the tax laws as archaic depreciation rules, which dampen plans for capital spending; provisions that tend to discourage economic incentive, and a whole host of other inequities. Purpose is to pinpoint weakness and thus beef up the case for tax reform.

The Ways and Means Committee is being very careful not to show its whole hand yet. The exact areas where reform will be undertaken will remain an official committee mystery for many months and probably into 1961. But based on stated views of both the U. S. Treasury and the Ways and Means Committee, here are some likely outcomes:

Individuals—Not much hope for cuts here, unless it's tinkering with deductions for lower- and middle-incomes. It's considered good psychological practice to emphasize high cost of cold war and space exploration by keeping individual rates high.

Corporations — A fair-to-good chance that the present 52 pct rate will be pegged downward by two to four percentage points. Reason: Growing awareness that economic growth is being stifled, due to the existing rates.

Depreciation—Good chance for reform here. But the form and scope of the relief is a long way from being agreed upon. Industry's strong presentation to Ways and Means Committee in 1959 helped considerably.

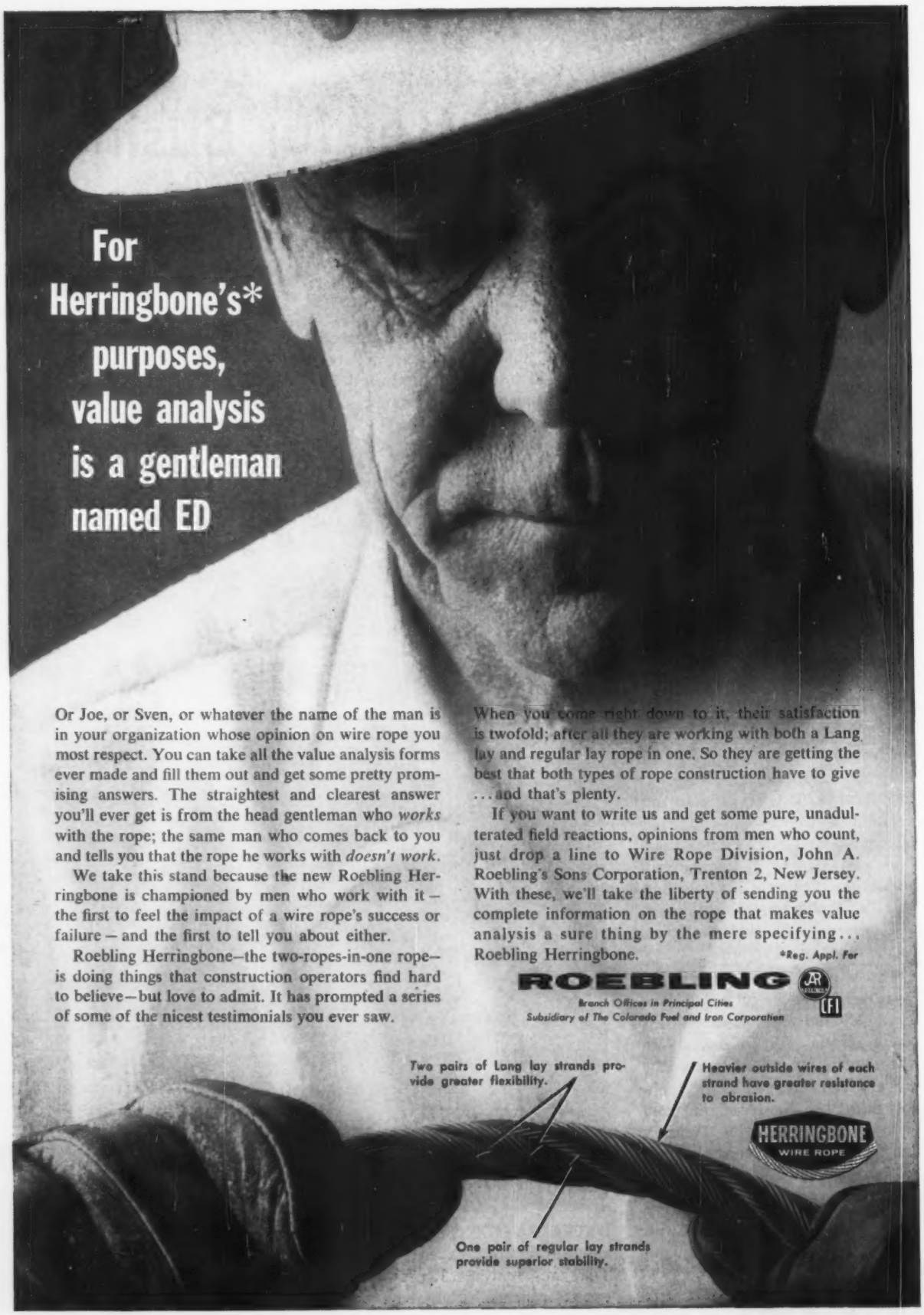
Excises—Not much hope for cuts here.

The important areas where relief may be on the way are depreciation and the rates on corporate income. Keep banging away at the need for relief. Congress will be more responsive than usual to tax complaints in 1960.

Stockpiles Cut Back

Government stockpiles of industrial materials continue to shrink. It's part of a program to get out from under some storage costs. Also, Washington planners are beginning to realize that much of the commodities now in stockpiles probably won't ever be needed in warfare of the future.

DEPRECIATION FIGURES: At recent House hearings on depreciation allowances, these experts testified on need of revision of tax measures. They are, from left; James A. Polk, New York tax attorney, Joel Barlow, expert on depreciation; and Prof. W. A. Paton, U. of Chicago.


For Herringbone's* purposes, value analysis is a gentleman named ED
Two pairs of Lang lay strands provide greater flexibility.
Heavier outside wires of each strand have greater resistance to abrasion.
HERRINGBONE
WIRE ROPE
One pair of regular lay strands provide superior stability.

Or Joe, or Sven, or whatever the name of the man is in your organization whose opinion on wire rope you most respect. You can take all the value analysis forms ever made and fill them out and get some pretty promising answers. The straightest and clearest answer you'll ever get is from the head gentleman who *works* with the rope; the same man who comes back to you and tells you that the rope he works with *doesn't work*.

We take this stand because the new Roebling Herringbone is championed by men who work with it – the first to feel the impact of a wire rope's success or failure – and the first to tell you about either.

Roebling Herringbone–the two-ropes-in-one rope–is doing things that construction operators find hard to believe–but love to admit. It has prompted a series of some of the nicest testimonials you ever saw.

When you come right down to it, their satisfaction is twofold; after all they are working with both a Lang lay and regular lay rope in one. So they are getting the best that both types of rope construction have to give . . . and that's plenty.

If you want to write us and get some pure, unadulterated field reactions, opinions from men who count, just drop a line to Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey. With these, we'll take the liberty of sending you the complete information on the rope that makes value analysis a sure thing by the mere specifying . . . Roebling Herringbone.

*Reg. Appl. For

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

Alaskan Boom Will Be Delayed

Opportunities Plentiful, But Growth Will Be Slow

Any sudden mushrooming for metalworking in Alaska isn't likely.

Minerals potential is great, but present economy is not balanced.—By R. R. Kay.

▪ Talk of a fast industrial boom for Alaska just isn't realistic. It will be years before any broadening of the industrial base shows up. Until then, any boom-type markets for metalworking aren't in the cards.

Economic opportunities are there, to be sure. But the growth rate will be slow. Why?

Better Balance Needed—For one thing, the area is so vast—586,000 sq mi, about three-and-a-half times as big as California. This makes development and transportation both tough and costly.

Also, the economy must develop better balance. Right now it's lopsided. Alaska depends very heavily on Federal spending. The money goes for building and military facilities.

Mineral Payoff?—The state has high hopes for big business in minerals. Almost every material on the strategic and critical list is located there — including promising iron ore deposits.

But making minerals pay off depends on:

More exploration. So far, hardly one percent of Alaska has had a thorough going over.

Lower costs for getting and bringing out the minerals.

Greater need for the minerals in U. S. and world markets.

It's much the same story for petroleum. It has to be found, brought out, processed, and marketed.

There's no question about water power resources. But nobody's rushing to develop them. Army Engineers have enough sites pinpointed to create 19 million kilowatts—double the Pacific Northwest's hydroelectric power.

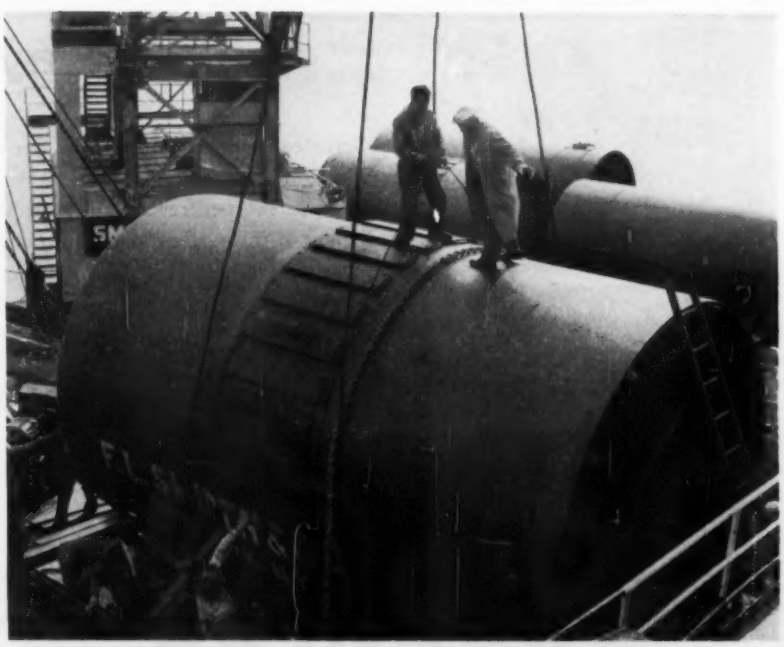
However, this wouldn't be low-cost power. And the sites are too deep inland for industrial users.

What's Needed—For the near future, there is a need in Alaska for these facilities—all using metalworking's products: Small foundries; canneries; freezing plants; meat packing plants; cement, pumice block, and brick-making plants; breweries; and flour mills.

If you want more details write for the excellent study, "Alaska: Frontier for Industry," prepared by the Economic Research Dept., Seattle-First National Bank, Seattle, Wash.

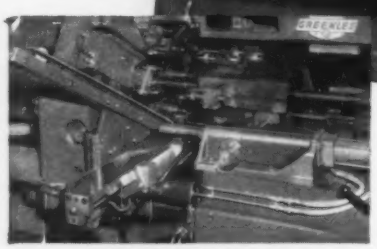
Alaska in the past has been a land of great rewards and great disappointments. And it will be so in the future, the Bank believes.

Kiln Boards Ship for Hawaiian Trip

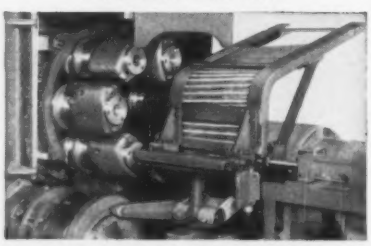


CEMENT PRODUCER: First sections of giant rotating cement kiln leave West Coast for trip to new cement producing plant near Honolulu. Kiln sections, each weighing over 580 tons, were built at Kaiser Steel's Napa, Calif., Fabricating Div. plant from one-inch plate.

Second Operation



MAGAZINE LOADING



REAR LOADING MAGAZINE

HAND LOADING

A Method of Machining That Pays Off

Greenlee standard Automatic Bar Machines, adapted for second operation work, profitably machine a wide variety of parts. Long shafts or short pieces are automatically loaded into the work spindle by any of the various loading arrangements shown. Parts are loaded in one position during the machining cycle, and machined in the remaining five cross slide and end working positions. For more information, see your Greenlee Distributor.

GREENLEE STANDARD AND SPECIAL MACHINE TOOLS

- Multiple-Spindle Drilling and Tapping Machines
- Transfer-Type Processing Machines
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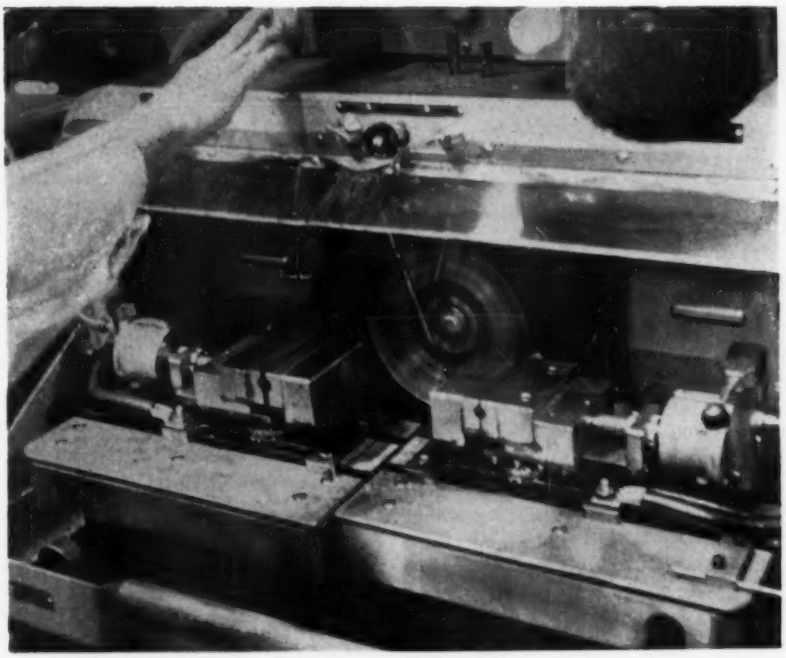
Electro-Machining Looks Ahead

Higher Metal Removing Rates May Widen Uses

Chipless methods of metal removal still look promising for the future.

But a lot of development work is still needed before they're used for production jobs.—By R. H. Eshelman.



ELECTRO-GRINDER: This Hammond Oscillating Electrolytic Grinder is designed for relatively high production, pushbutton grinding.

▪ Up 'til now electro-machining, including all its variations, has still to realize its full potential in metalworking.

Industry sources estimate there are perhaps about a thousand units in actual use in the U. S. today. Of these probably 75 pct or more are found in toolrooms and on die jobs. The other machines are starting to make headway on true production work—more of the small job lots common to missile, atomic energy, jet engine and advanced parts involving hard materials.

After more than ten years of development these chipless techniques are just on the verge of attaining wider user acceptance. Why?

Behind the Lag—Perhaps two factors account for the holdup. One, limited metal removal rates. The other is the problem of machine design for a unique and unconventional process.

Then too, like titanium and other miracle metals, advantages may have been oversold, while limitations were soft-pedaled. For instance, the initial spark-discharge type system (EDM) gave a maximum penetration rate of somewhat under an inch per hour, according to M. E. Merchant, Research Director, Cincinnati Milling.

Soviet Progress—The Soviet Exhibition in New York this summer demonstrated a real breakthrough in electro-discharge machining. It's the Russian impulse-generator unit which reportedly boosts the metal removal rate double or more than that of similar American machines. These are rough cuts, however. Much work would probably require finishing on slower machines.

Several builders such as Matson Company, Detroit, and others have taken a leaf from the Russians. They're developing new units with much higher metal removal rates.

And then there's Anocut's electrolytic grinding process. It shows real promise, and an excellent metal removal rate. The firm is stimulating broad applications by working with many machine builders. This approach may overcome some of the drawbacks to the process in the past.

What Are Prospects? As to the immediate future, it's likely that tool and die uses will continue to have best prospects. Even there, diecasting dies, plastic molds and other jobs with intricate sections, or high production where many dies are needed, offer the logical field, according to application engineers.

Long-range prospects of electro-discharge, electrolytic grinding, the newer electron beam machining, and even plasma jet machining still look rosy, because we're getting into new, tougher alloys more and more. On basis of present results, it'll be a long time before they displace metalcutting in production.

INDUSTRIAL BRIEFS

Aim at Automakers—Kaiser Aluminum & Chemical Corp.'s new automotive business development office is at 2480 W. Maple Ave., Birmingham, Mich. Automotive sales offices of the company are still at 7700 Second Ave., Detroit.

Before the Count Down — Producers and users of rocket materials, and materials requiring high-temperature tolerance and resistance to high velocity gas flow can now have these tested at the Atlantic Research Corp., Alexandria, Va. The company will use both standard solid propellants and the new high-impulse aluminized propellants in its testing.

Strike a Bargain — Universal Match Corp. will acquire the Wrought Iron Range Co. Universal will exchange 150,000 shares of its stock for 46,800 of Wrought Iron Range. Both are headquartered in St. Louis. In addition to making kitchen equipment, Wrought Iron Range has a contract to make mail boxes for the U. S. Post Office.

New Line—After making only gray iron molding for 127 years, Swayne, Robinson & Co., Richmond, Ind., will now cast aluminum. Initially, the new aluminum line is expected to account for 10 pct of the company's business, and grow until it hits about 30 pct. The foundry will make aluminum parts for mobile and portable equipment.

Castings Aid — Johns-Manville has developed a riser sleeve for nonferrous castings which it says offers more than twice the insulating value of conventional sleeves. The company claims that the lower rate of heat transfer allows the use of smaller risers, increasing the number of castings per melt.

Presidents — Several metalworking associations announce their top executive officers for 1960. The National Spring Mfg. Assn. re-elected Harry C. Faust, Paragon Spring Co., Chicago, president. The Conveyor Equipment Mfg. Assn. elected Orlan A. Johnson, Gifford-Wood Co., Hudson, N. Y., president. New president of Electric Overhead Crane Inst. is William H. Morgan, The Morgan Engineering Co., Alliance, O.

Better Line—Aluminum Co. of America has made available a new group of sheet and plate alloys the company says are superior to other metals, including previously available aluminum alloys, in resisting corrosive perforation by hot water. The new alloys were developed during a 10-year research program conducted by Alcoa in cooperation with two leading hot water heater manufacturers.

Jet Checker Set—A fully integrated test facility for the complete checking of jet engines has been built and shipped by Greer Hydraulics, Inc. The equipment, which concentrates maintenance, contains four machines which work at high precision on vital jet engine components. The first set will be used in Europe by Scandinavian Airlines System.

Coming Merger—Agreement to merge has been reached by Robinson Technical Products, Inc. and the Kensico Tube Co., Inc. Under the terms, Kensico, a Mt. Kisco, N. Y. manufacturer of copper tubing, would become a division of Robinson. Robinson, located at Teterboro, N. J., makes metal shock absorbing equipment for missiles, planes, and space vehicles.

"You're fired!"

Ore for Wheeling — Wheeling Steel Corp. will transport nearly 300,000 tons of iron ore stockpiled at Benwood, West Va., to its blast furnaces at Stubenville, O. The ore will be taken by truck to the Ohio River, barged to Mingo Junction, O., and then hauled by truck to the Stubenville Works.

Custom Coke — A miniature coke oven that produces blast furnace coke in pounds rather than in tons has been put in operation at the Campbell Works of the Youngstown Sheet and Tube Co. The oven is part of a new carbonization laboratory.

Burying the Birds—Construction of the U. S.'s first underground missile-launching base at Lowry Air Force Base, Denver, will require some 66,000 tons of steel products, according to the American Iron and Steel Institute. The facility will consist of six subterranean complexes or sites. Each complex will have three steel and concrete silos, 40 ft in diameter and more than 150 ft deep, each of which will house a ready-to-fire "Titan" intercontinental ballistic missile.

Budding Expansion—The Budd Co. is planning to expand its autobody plant in Gary, Ind. Budd directors have approved the second phase of a $5½ million program, covering the expansion of press, assembly and shipping areas. This phase will be carried out in 1960. It will also include an underbody assembly line, welding equipment, press equipment and shipping facilities.

New Company — Quaker Alloy Casting Co., Myerstown, Pa., has acquired The Hartford Electric Steel Corp., Hartford, Conn. The new company will operate as a subsidiary of Quaker Alloy and will be known as the New England Alloy Casting Corp.

Edward K. Waldschmidt, appointed manager, sales, Bar Div., Republic Steel Corp.

C. L. Emerson, elected vice president, sales, Kaiser Steel Corp.

E. G. Sheasby, elected vice president, sales, Bliss & Laughlin, Inc.

The Beryllium Corp., Technical Div.—**Dr. J. P. Denny,** named project supervisor, physical metallurgy.

Lockhart Iron & Steel Co., Aluminum Div.—**D. L. Schmitt,** appointed sales manager.

The Youngstown Foundry & Machine Co.—**F. J. Gentile,** appointed chief engineer; **J. A. Becker,** appointed asst. chief engineer and **A. P. Sgambati,** appointed project engineer.

Wheelabrator Corp. — **William Butler, III,** appointed administrative asst. to the president.

The Elwell-Parker Electric Co. —**J. W. McEwan,** named asst. sales manager.

Aluminum Co. of America, Rome Cable Div.—**F. R. Dallye,** appointed product manager, electrical conductor accessories; **W. W. Knapp,** product manager, overhead transmission and distribution conductors; **D. H. Thayer,** product manager, building construction conductors; and **J. R. Woods,** product manager, power conductors.

Continental Mfg. Co.—**L. I. S. Conway,** appointed regional sales manager.

Hughes Aircraft Co.—**I. F. Richardson,** appointed manager, Hughes Products Group, Commercial Div.

The Carborundum Co.—**G. O. Watson,** promoted to asst. director, marketing.

Erickson Tool Co. — **D. D. Walker,** appointed asst. chief engineer.

The Eimco Corp.—**W. L. Dowdey,** appointed general sales manager; P. O. Richter, named general manager, Filter Div.

International Business Machines Corp.—**G. H. Rathe, Jr.,** appointed director, market planning.

Henry P. Rankin, Jr., appointed assistant general manager, sales, Republic Steel Corp.

Kaiser Aluminum & Chemical Sales, Inc.—**C. W. Unbehaun,** appointed engineering manager, automotive sales.

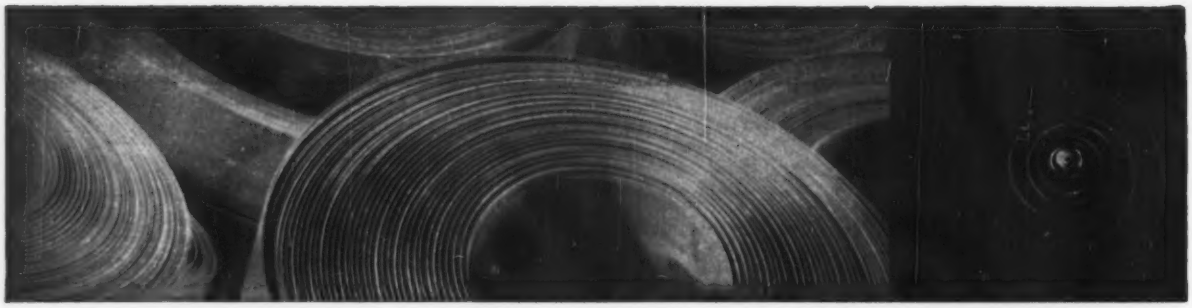
The Eimco Corp.—**W. M. Phillips,** promoted to manager, Southern district.

Albert H. Clem, named vice president, marketing, Pennsalt Chemicals Corp.

OBITUARIES

J. H. Zurn, 34, vice president, Zurn Industries, Inc.

J. D. Bradley, 49, president, The Bunker Hill Co., San Francisco.



Check your requirements against these

Wallace Barnes Cold-rolled Specialty Steels

Furnished in these carbon grades:

1.25 – 1.32% .90 – 1.05% .70 – .80% .59 – .74% .48 – .55%

ANNEALED AND HARD-ROLLED

Thickness

.003 – .010″	in widths	1/8	to 6 1/4″
.011 – .014″	“ “	3/16	to 11″
.015 – .019″	“ “	3/16	to 13″
.020 – .035″	“ “	1/4	to 13″
.036 – .049″	in widths	3/8	to 13″
.050 – .064″	“ “	1/2	to 13″
.065 – .093″	“ “	3/4	to 6 1/4″
.093 – .125″	“ “	3/4	to 6 1/4″

HARDENED AND TEMPERED

Scale-free or scaleless; polished*; polished and blued*; polished and strawed*

Thickness

.003 – .004″	in widths	1/8	to 2″
.005 – .007″	“ “	1/8	to 3″
.008 – .009″	“ “	1/8	to 4″
.010 – .014″	“ “	3/16	to 5″
.015 – .019″	“ “	3/16	to 7″
.020 – .025″	“ “	1/4	to 8 1/2″
.026 – .030″	“ “	1/4	to 8″
.031 – .035″	in widths	1/4	to 7″
.036 – .040″	“ “	3/8	to 7″
.041 – .049″	“ “	3/8	to 6″
.050 – .060″	“ “	1/2	to 4″
.061 – .064″	“ “	1/2	to 3″
.065 – .093″	“ “	3/4	to 3″

*Maximum width for polishing in .010 – .030 thickness ranges is 5 in.

Facilities for processing alloy steels also are available.

Standard sizes normally available for prompt shipments.

Write for a copy of “Physical Property Charts” that give performance characteristics of .90 – 1.05% and .70 – .80% carbon grades.

Wallace Barnes Steel Division

Bristol, Connecticut

Associated Spring Corporation

Inspect Hot Steel Blooms Without Slowing Production

Betatrons are taking up where conventional X-ray units leave off; they examine extra-heavy sections—up to 20 in. thick.

Here's a unit that goes a step further. It provides instantaneous inspection of hot steel blooms.

▪ X-rays and gamma ray units are valuable aids to non-destructive testing. They examine many different sizes and types of parts; and they record, usually on film, any defects in the part being tested.

Industry, however, has been calling for more "basic inspection of metals—as far back as possible." Intentions are to locate defects in hot ingots, blooms, or billets before they are fabricated into other forms.

Need Other Equipment — Thus, equipment is needed for inspection of thicker sections, and in less time than it takes with conventional X-rays.

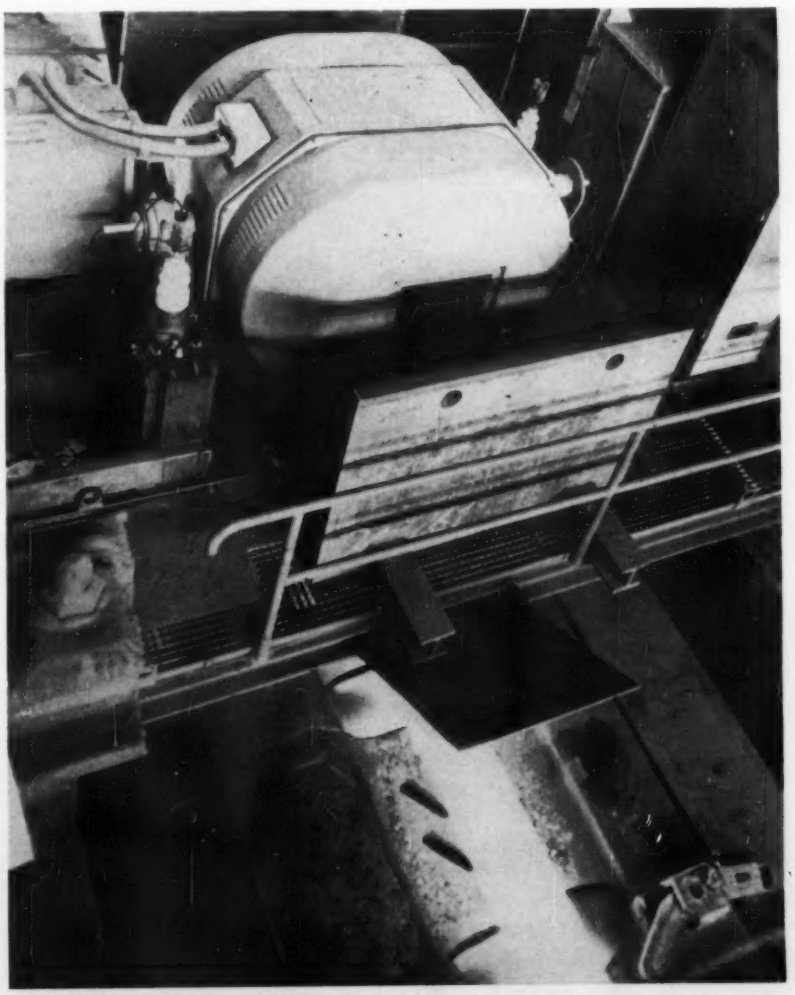
"During the past few years, the betatron has become a very important and useful apparatus for non-destructive testing." The speaker was Dr. M. Sempert, Baden, Switzerland, at the recent annual convention of the Society for Non-destructive Testing.

The betatron is an electron accelerator which produces high-output, high-energy X-rays. It permits the examination of thick metal sections.

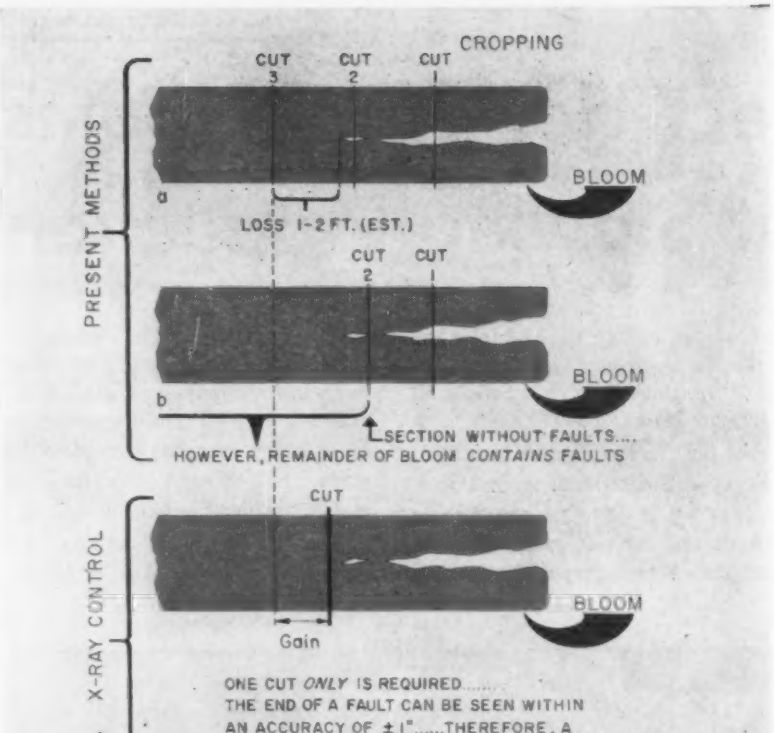
Inspects Thick Sections — One such unit, made by Brown-Boveri & Co., Ltd., Baden, Switzerland, was described by Dr. Sempert. With an output energy of 31-MeV, the betatron is inspecting sections up to 20 in. thick in several Swiss and German plants.

At the George Fischer Ltd. Steel Works in Switzerland, for example, a betatron is testing large turbine wheels and aircraft parts. Another unit tests very large tube and boiler casings at the tube works of Phoenix-Rheinrohr Ltd. in Germany. A blooming and semi-finishing mill at Duisburg-Ruhrort in Germany recently completed a study of "basic inspection of metals" using this unit.

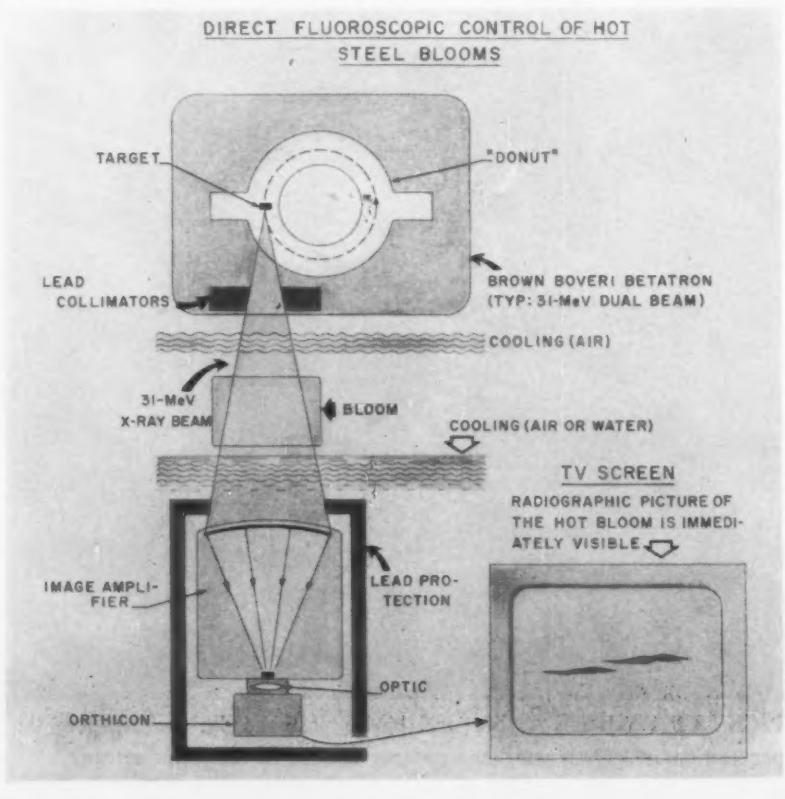
The Brown-Boveri betatron has a feature which makes it unique



PICKS UP FAULTS: As hot steel bloom passes under the betatron, the penetration image, showing any defects, is sent to television screen.



LOCATE BLOOM DEFECTS: Top drawing points out how easy it is to crop bloom in the wrong place without X-ray control. Schematic on bottom shows how image of bloom defects is picked up by television unit.



from most other testing equipment. According to the Princeton Div. of Curtiss-Wright Corp., Princeton, N. J., sole distributors of the unit in this country, it provides instantaneous inspection of hot steel billets up to 12 in. thick.

Why Special Equipment?—Why is it so important to use X-ray type equipment to inspect blooms and billets? And why the emphasis on "instantaneous inspection of hot billets"?

Dr. Kurt Fink, chief physicist and metallurgist at Phoenix-Rheinrohr, recently discussed this aspect of non-destructive testing.

After cogging from ingots, blooms are trimmed to remove the pipe. The foreman often bases his cut on steel analysis, type of casting, or intended use.

But, usually variations in the pouring and solidification conditions call for a trial-and-error method to locate the end of the pipe.

The first drawing shows how this can easily result in good material being scrapped or defective material passing on for conversion into plate or sheet.

Leads to Delays—However, the time required to make visible images on film involves long delays; and a delay results in temperature losses in the rolling stock. The advantages of instantaneous inspection are obvious.

Using the Brown-Boveri unit, an operator, stationed some distance away from the rolling stock, observes the radiation pattern of the test piece on a television screen.

The second drawing shows how the various parts of the unit combine to produce this instantaneous image.

The betatron is arranged so that the X-ray beam is directed perpendicularly to the roller table. Accessories to the unit are located nearby.

Electrons Speed Up—A gun injects electrons into the donut. Under the action of a magnetic guiding field, the electrons orbit inside the donut, continually accelerating until they attain a kinetic energy of

31-MeV. (Donut lifetime is estimated to be better than 2000 hours.

At this point, the orbit is expanded until the electrons hit a target and, in being retarded, generate hard gamma rays.

After collimation, the beam passes through the hot steel bloom and strikes the primary screen of a special X-ray image intensifier tube. This tube is encased in a thick-walled, lead container to shut out any interference by scattered radiation.

Aluminum sheets arranged below the betatron, and a water-cooled flat box above the image intensifier, provide protection against the heat radiation given off by the hot blooms.

Sends to TV Screen—An orthicon camera takes the image, after amplification, and transmits it to the television screen where the operator can note any defects in the bloom. Pipes with widths of ⅛ to 1/16 in. can be detected.

With this X-ray control, the end of a fault can be seen within an accuracy of ± 1 in. The foreman need make only one cut. A potential gain in steel production is noted by several steel companies who are showing considerable interest in this unit.

The drawing shows only one beam of radiation being emitted. However, the Brown-Boveri betatron can also function as a dual beam unit.

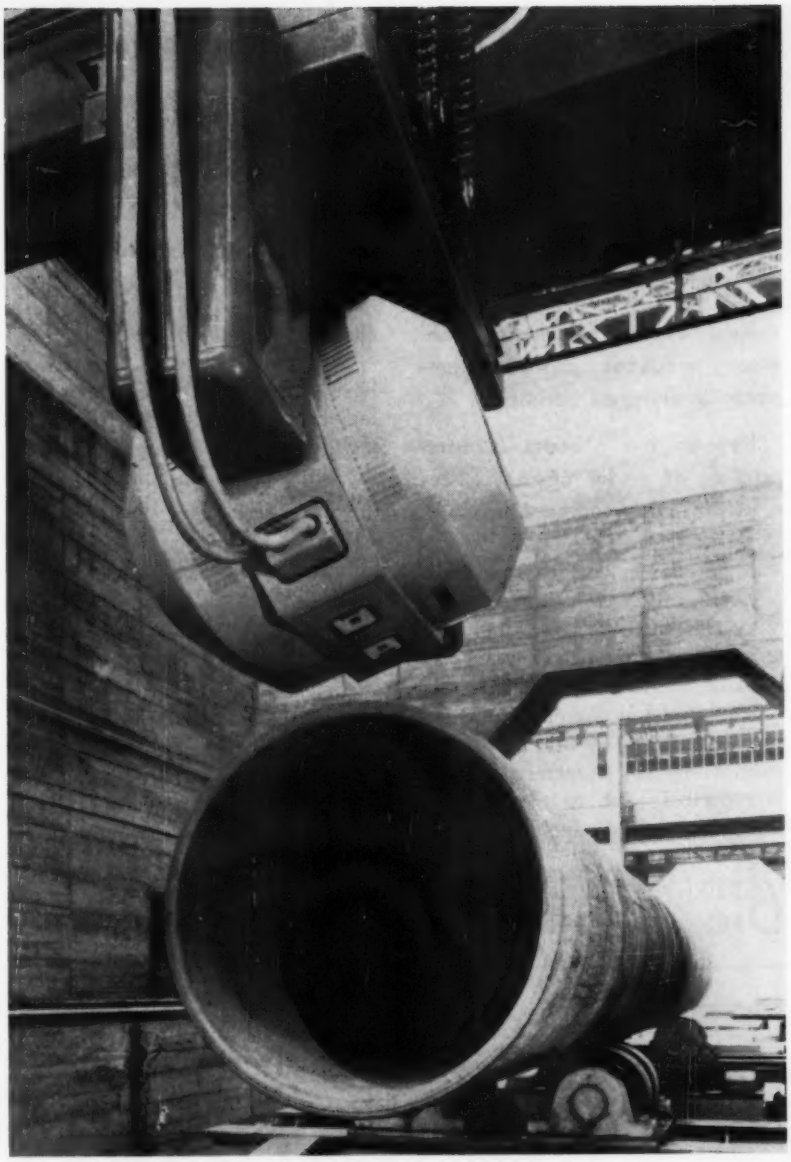
Produce Second Beam—If another target is inserted at the opposite end of the donut, electrons will hit it during the second half-cycle of the ac energizing current, and a second beam of radiation will be produced.

This feature comes in very handy when the unit is used for standard radiographic work. As Dr. Sempert pointed out, radiographs having twice the width of a single beam radiograph can he taken.

Stereoscopic radiographs can be easily made also. Each beam produces one-half of the stereoscopic picture on a separate film. On being viewed through the proper instrument, the films produce three-dimensional images of the object. Using this method, the spacial position of a defect can be calculated.

Dr. Sempert discussed several other advantages of the betatron. The unit has high fault sensitivity and is very good at enlarging radiographs. This means that an operator can easily distinguish between different types of faults (blowholes, cracks, inclusions, etc.), and that these faults can be clearly enlarged for proper study.

Low contrast of radiographs, taken by betatrons, are also an advantage. They are very helpful in testing components with large variations in thickness.



INSPECTS LARGE PARTS: High-output, high-energy (31-MeV) betatron inspects large tube at the Phoenix-Rheinrohr Ltd. tube works in Germany.

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Try Hot Explosive-Compacting For Sintered Powder Products

By Alan Cross—Engineer-in-Charge, Storchheim Research & Development Corp., Woodside, N. Y.

New explosive-forming technique produces powder compacts in sintered condition.

Key to the process is compacting of metal above its recrystallization temperature.

▪ Materials made from metal powders are growing in interest. Very often they offer improved mechanical properties over conventionally fabricated materials.

SAP (sintered aluminum powder) products have shown very good strength at high temperatures. This is reportedly due to the presence of 5-17 pct of finely dispersed aluminum oxide in the matrix.

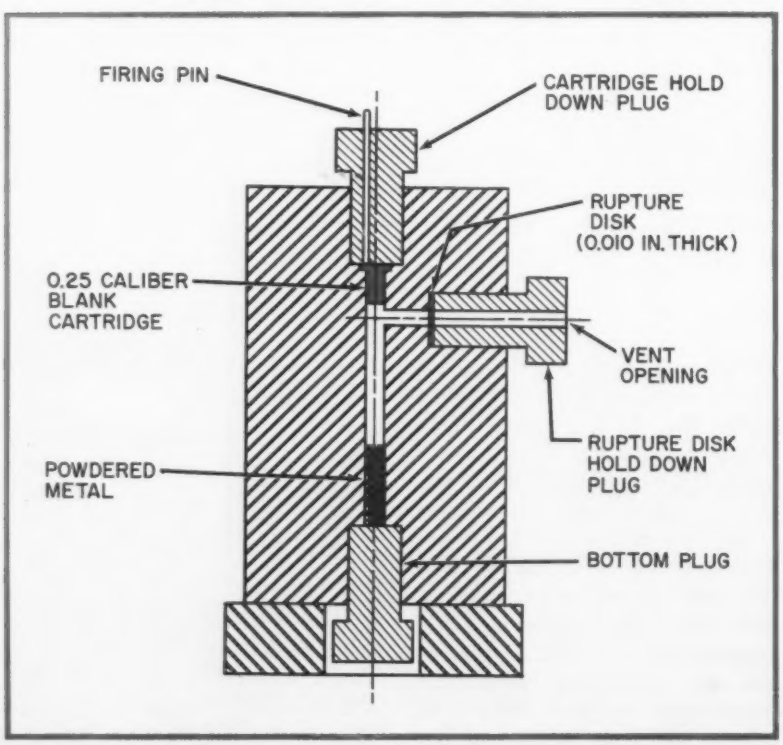
SAP type materials, moreover, have a maximum useful operating temperature equal to 82 pct of the melting point of aluminum. But the best high temperature alloys developed, which use the dispersion hardening principle, have maximum operating temperatures equal to only 46-79 pct of the melting point of the alloy base metal.

Rolls Strip—Thus, there is a great need for the development of powder products for use in high temperatures. One answer is powder rolling. This technique directly converts metal powders into strip having outstanding properties at both room and elevated temperatures. Even refractory metals, such as tungsten and molybdenum, can be converted into fully densified strip.

Powder rolling, however, is limited to materials with a uniform cross-section. We need some other method for working with sections of irregular cross-section.

Explosive-forming has been getting some attention in this vein. Among its advantages are: the ability to form materials with a minimum of springback; cheap processing of large sections since forming presses are eliminated; forming of difficult shapes such as bulges or necks in tubes.

Die "Bangs Out" Powder Forms



Compacts Powders—Explosive-forming also appears to offer a handy answer to the problem of consolidating metal powders into forms too hard or impossible to make by normal techniques.

Materials, fabricated by explosive-compacting, would conform to the dimensions of the finished die; and a minimum of machining operations would be required to produce a finished part. Thus, the high material losses and cost, associated with normal operations such as casting, soaking, forging, and machining, would be virtually eliminated.

Our preliminary study intends only to establish the feasibility of the process—to determine whether a fully densified material, having suitable mechanical properties, could be obtained by explosive-compacting.

Needs No Sintering—The hot-explosive technique appears to be the best approach. This method compacts powders above their recrystal-

lization temperatures. Thus, the process involves hot working of the metal powders; no sintering of the compact is necessary.

To simulate hot compacting, lead was chosen. This material has a recrystallization temperature below room temperature. Thus, it is possible, by working with this material at room temperature, to determine how other materials might respond to hot explosive-forming.

The die, used in the work, consists of a carbon steel body, 5 in. OD x ¼ in. ID x 8 in. high; the upper end is bored to receive a 0.25 caliber blank cartridge.

Uses Rupture Discs—The plug at the bottom of the die cavity permits the finished compact to be rodded out after the forming operation. Another plug clamps rupture disks over the vent opening at the side of the die.

These discs are of cold worked copper about 0.010 in. thick and have tensile strengths of 60,000 psi. By changing the number of disks used, it is possible to vary the peak pressure in the die.

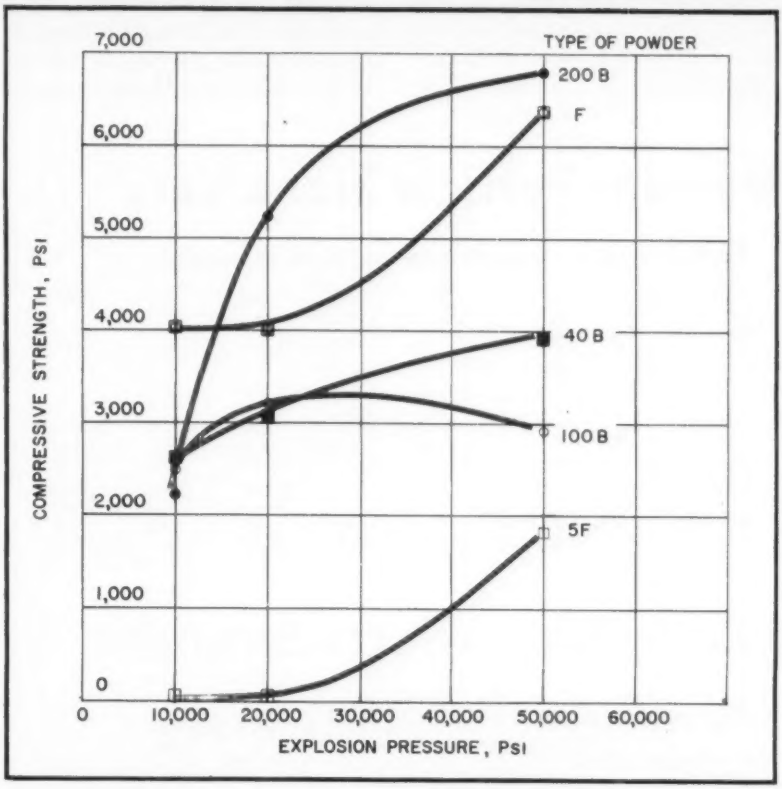
Table 1 gives the physical properties of the five types of lead powders used. The selected powders provide a wide variation in particle sizes and oxide film thicknesses; these two variables were believed to play a major role in regard to the properties of the powder product.

Pressures Affect Strengths—Results of the tests are plotted on the two graphs. The first graph shows that the higher the explosion pressures, the higher are the compact strengths. It also appears that there is an optimum particle size for a given explosion pressure.

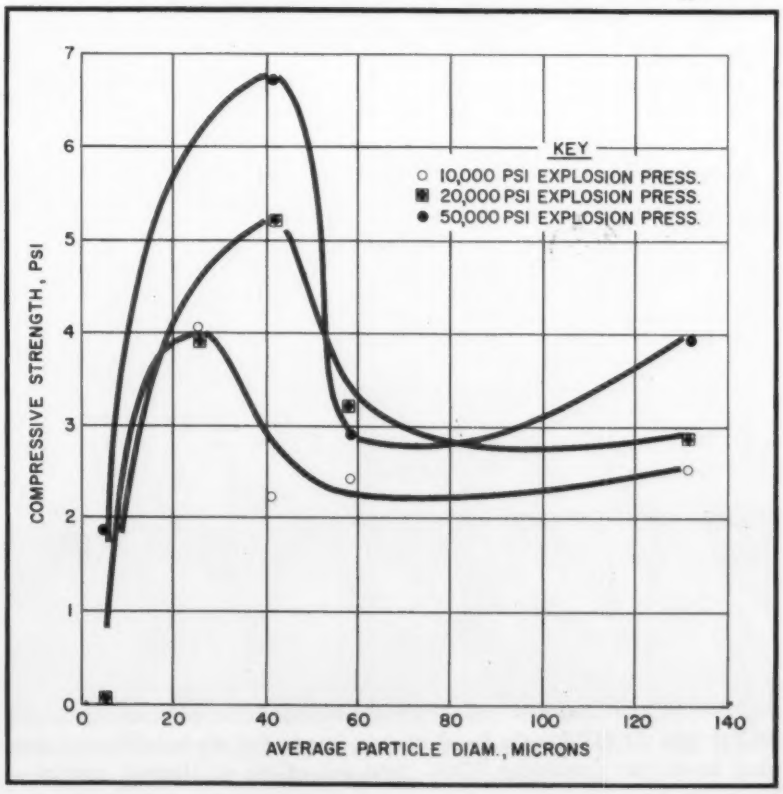
One expects that small particles tend to give a powder product of higher strength. Experience in rolling of powders shows us that this is the case. This is because the surface to volume ratios of small particles are greater than those of large particles.

On the other hand, oxide films tend to inhibit bonding between

Points Up Optimum Powder Size



Pressures Boost Strengths



powder particles. Thus, small particles can be at a disadvantage in any compaction process; their surface area and, consequently, their oxide content are generally greater than those of coarse powders.

Breaks Oxide Films—The harmful effect of high oxide content, as compared with the beneficial effect of high surface to volume ratio, is not as apparent in the case of powder rolling as in explosive compacting. The movement of powder particles during rolling apparently ruptures the oxide films more readily.

Another measure of the effect of explosion pressure uses average particle diameter as a parameter. The second graph shows that, in nearly all instances, the strength of the compacts increases with the explosion pressures.

But note that the 200B compacts, which are not made of smallest particle size, have the highest strengths. Therefore, to rate the powders on the basis of their response to explosive-forming, we use the ratio D/T, the average particle diameter divided by the oxide film thickness.

Table 2 shows that, at compacting pressures above 10,000 psi, the highest strengths are associated with a high D/T ratio.

Conforms Closely — The study also indicates that powders, fabricated by explosive-compacting, conform closely to the die dimensions regardless of the explosion pressure used—at least in the range 10,000 —50,000 psi.

Finished parts can conceivably be produced with no machining at all. Thus explosive-compacting of metal powders shows promise for producing metal parts for high temperature or other applications. There is almost no loss of material; there are a minimum number of processing steps.

Alloy material can be fabricated by using prealloyed powders; alloys can also be made by compacting heated elemental powders, then giving the compacts a homogenization heat teatment.

Forms Odd Shapes—Explosive-compacting of powder can also form unusual shapes with high length-diameter ratios or variable cross-sections. Fully densified compacts of lead with length-diameter ratios in excess of 4 to 1, have been produced.

Powder Particle Sizes Vary

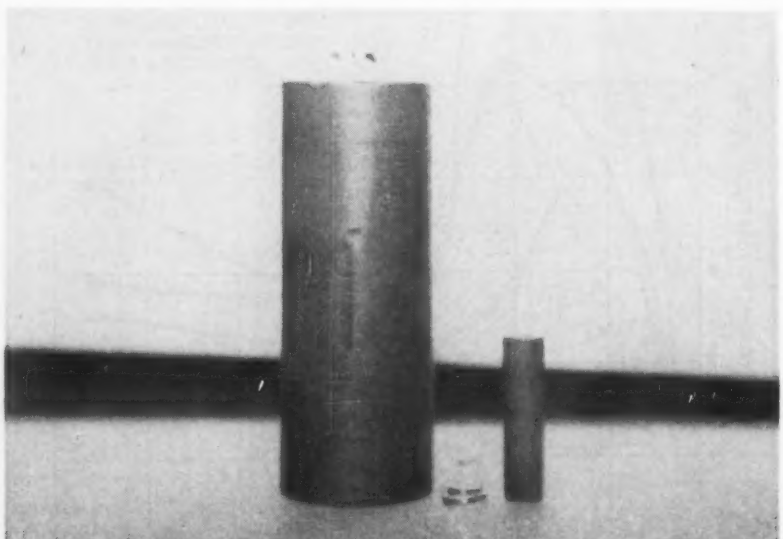
TABLE 1: Characteristics of Lead Powder

Grade of Powder	40B	100B	200B	F	SF
Mesh Fraction Distribution, wt. pct, U.S.S. Series					
+80	38.5	0.0	0.0		
−80/+100	13.0	0.0	0.2		
−100/+200	47.8	18.3	6.0		
−200/+325	0.7	46.4	52.0		
−325	0.0	35.3	42.0	100	100
Apparent Density, g/cc	5.67	6.10	5.70	4.53	4.4
Flow Rate, seconds	82	60.5	Non-flowing	Non-flowing	Non-flowing
Average Particle Size, microns	131	59	41	26	5
Average Oxygen Content, wt. pct	0.59	0.14	0.17	0.27	0.36

Oxide Film Affects Strength

TABLE 2: Strengths as Function of D/T Ratio

Explosion Pressure, psi		20,000	50,000
Type of Powder	Average Particle Diam./ Oxide Film Thickness	Strength of Compact, psi	
SF	16.6	—	1,900
40B	26.2	3,100	4,000
F	52	4,000	—
200B	72	5,200	6,600



NEED NO SINTERING: Lead shapes, made by explosive-compacting, need no further processing. They come out of die in sintered condition.

Form and Cut Parts Continuously

Chipless Process Rolls Wire or Bar Stock to Shape

Here's a compact unit that out-produces more complex machines. And it eliminates waste.

Chipless rolling operations can include thread forming, upsetting and cut-off.

▪ Many different combinations of roll forming and heading operations —plus rotary swaging—are generally used to produce small parts quickly. These processes are normally done in steps. Therefore, the highest output rates depend largely on the amount of stock fed to the various stages.

Multi-operation screw machines can produce identical items. However, since operations are not continuous (in stepped stages), a lot of set-up time is lost. In addition, plenty of scrap, in the form of chips, piles up.

No Steps — A new continuous cut-off and forming machine eliminates multi-stage production steps. And it does away with waste. Intermediate handling problems go out the window. Even process control is minimized.

Operations can include thread forming, upsetting and cut-off. A continuous, chipless, rolling process forms the revolving figure from either wire or bar stock.

Patent applications for this experimental unit have been filed by the Armour Research Foundation of Illinois Institute of Technology, Chicago.

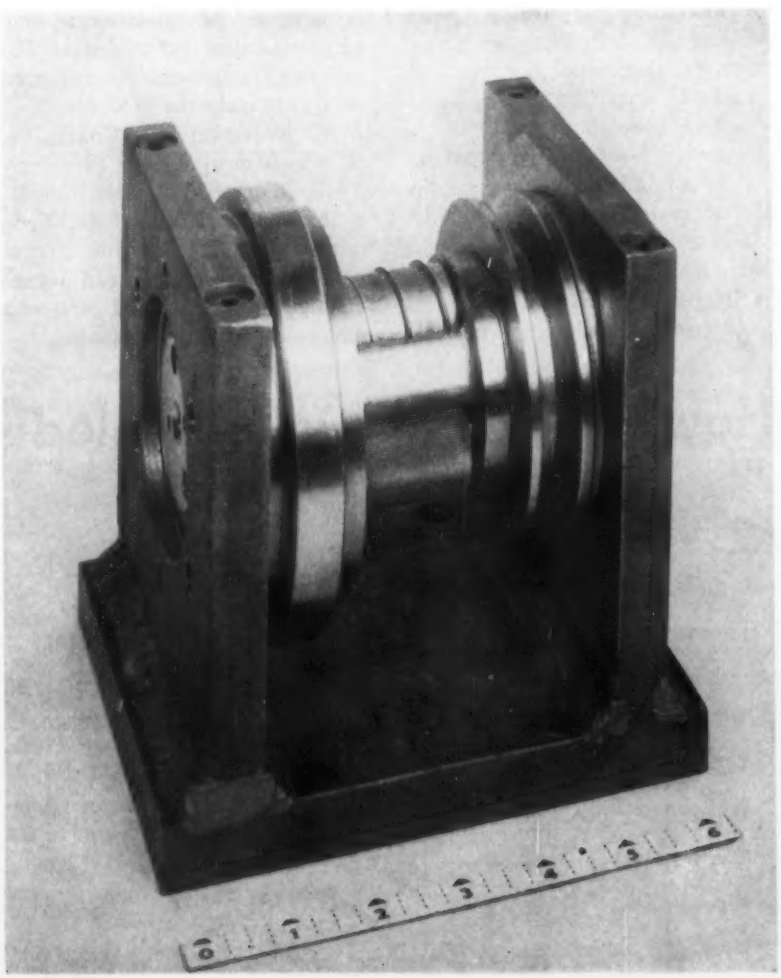
How It's Done—Included in the device is a form roll with constant root diameter and helical forming profile of increasing height. Supporting the stock, during the rolling process, are a line-knurled (back-up) roll and side guides.

Rotation of the form and back-up rolls causes stock rotation. The form roll bites, or rolls into, the stock. With continued rotation, the stock is drawn axially along the roll as the helical form bites deeper and deeper.

Cut - Off — After the profile reaches the maximum stock radius, the cut-off takes place as the figure is completed. This continuous process includes constant volume with no stock removal — the lead of the helix expands to maintain the volume.

Driving the system is a planetary unit with stationary ring gear and with planet gears keyed to each drive roll. Rotation of a cage or roll carrier causes the rolls to revolve and drive the stock.

The only precision part in the machine is the form roll. All other parts are easily designed and built from standard materials.



SIMPLE DESIGN: This compact unit, shown without drive, forms parts quickly in a continuous, chipless, rolling operation.

Arctic Welding Helps Erect Missile Warning System

By **R. P. Gibson** and **J. C. Holmstock**—Air Reduction Sales Co., Philadelphia

Our national defense relies on the ability of equipment to operate under new and different conditions.

In Greenland, 36 welding machines met this challenge by running 24 hours a day in subfreezing weather.

▪ Up in Thule, Greenland, construction goes on 365 days a year, welding included. There are times, however, that winds become very violent. Rather than imperil worker safety, all work must stop.

Among the most unusual construction in this barren wasteland is the Greenland station of the Ballistic Missile Early Warning System being built by the U. S. Army Corps of Engineers for the Air Force.

Electronic equipment in this project is larger and more complex than any ever produced. Each of the giant antennas is 165 ft high and 400 ft wide.

Present plans call for a network of three BMEWS, in addition to Thule. Another is under construction in Alaska, while a third one has not been announced.

Miles of Welds—More than 88 miles of welding were required to complete the job. Base metals were galvanized steel and mild steel. The problem: To find equipment rugged enough to make the welds.

Air Reduction Sales Co., a Div. of Air Reduction Co., Inc., New York, shipped 20 Aircomatic units to the Thule Air Force Base. Each one was complete with control panel, wire feeder, pull gun, water-circulating system, and 450-amp motor-generator power source.

Also included in the shipment were 16 Miget sets for spot welding. Each one of these units had its own gun, control, special control panel, and 200-amp rectifier power supply. All 36 machines were mounted on three-wheel carts.

To round out the supplies, 22 tons of fully-annealed silicon-bronze wire were shipped along with the units. Most of the wire, 41,000 lb in fact, was packaged in 25-lb spools for use with Aircomatic equipment. The balance, in 2½-lb spools, was for spot welding.

The Powerhouse — To provide the needed shielding, the buildings are sheet metal panel construction over iron framework. Passageways of like construction form connecting links between buildings.

Plenum chambers under the main buildings provide circulation of air. This was necessary to minimize the melting of ice a few feet below the earth's surface. It was vital that the whole building be sealed to preclude the deadly radar emanations from penetrating.

The best way to seal the building was by welding. The equipment itself had to be durable to withstand the adverse weather conditions and the expected rough handling.

All of the welds joined panels to hat-type section expansion joints. All-position welding on lap joints was consistent throughout. The material was 16-gage galvanized sheet.

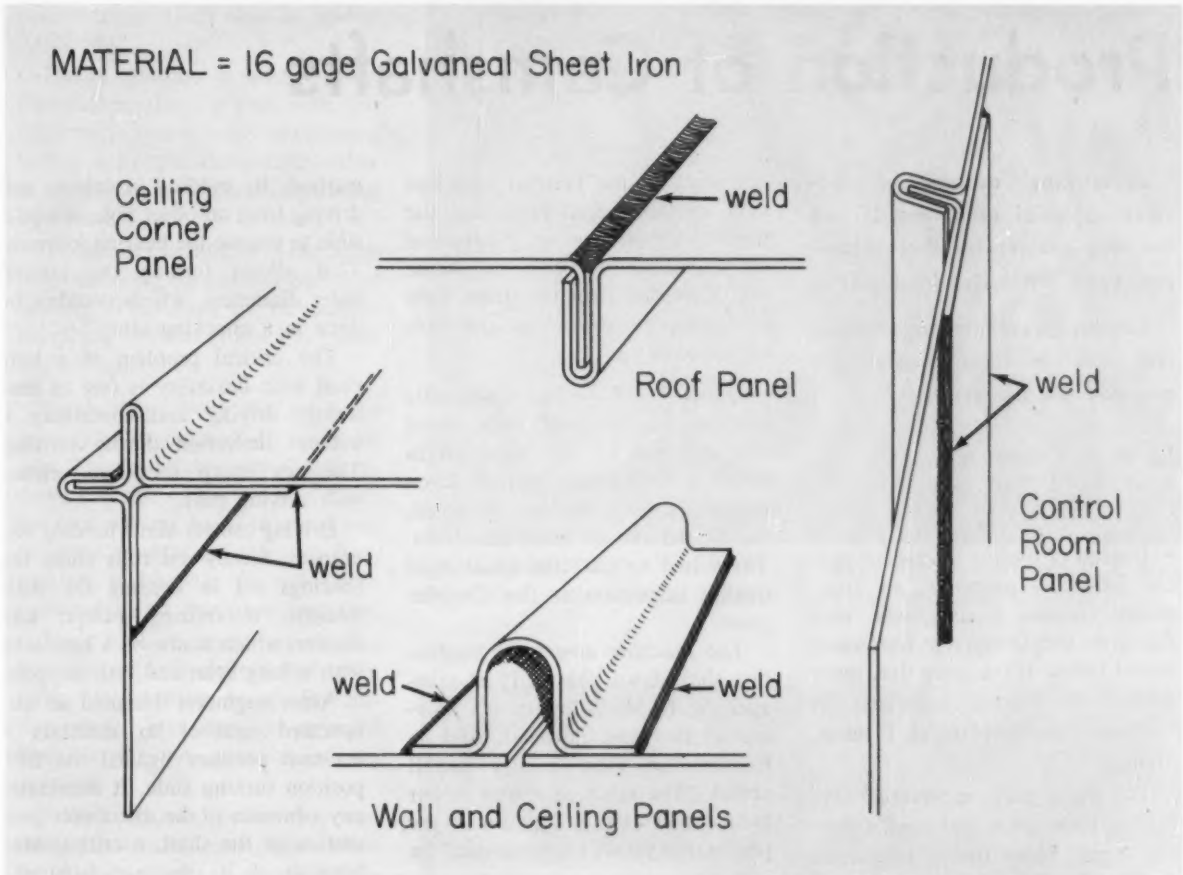
The biggest problem resulted from "phase conditions." When such conditions prevail, outdoor work stops, according to the degree of wind velocity. Any time winds reach 30 knots, the condition is on.

Custom Design—Airco engineers

How the Building Was Sealed

	AMOUNT OF WELDING, FT			
LOCATION	YARD PANEL	BUILDING PANEL	RADIO-FREQUENCY BUILDING	TOTAL
Transmitter 1	44,000	19,800	8,500	72,300
Transmitter 2	44,900	20,700	8,000	73,600
Transmitter 3	43,800	19,600	8,500	71,900
Scanners	57,200	17,600	2,400	77,200
Passageways	55,400	116,800	2,300	174,500
	245,300	194,500	29,700	469,500

Custom-Designed Joints Brave the Cold



developed a special spot-welding control for work at Thule. They added resistors, relays and capacitors, a switch, and a timer to the normal control panel.

Spot-welding guns were used for tack welding with 0.035-in. diam wire, while larger drive rolls fed wire more slowly and smoothly.

Since the operators had very little training in welding, they were much harder on equipment than a trained welder would be. But very few problems arose in the actual welding operations.

Weather Report — The welders were hard at work on Sept. 22, 1959. The high that day was 32°F. The low was 18°F. Winds were from the east at 10 to 12 knots.

The cold climate and high winds put the machines through a real test. Sudden gusts of winds often brought snow into the diesel generators. As a result, without any warning at all, voltages in the welding generators would rise and fall as much as 20 pct.

The severe conditions required many on-the-spot changes to equipment. Sturdier tubes, put into the circuitry, lessened failure introduced by voltage fluctuation.

No Warning—This same fluctuation also caused the starters to arc. To overcome this, engineers installed new points. Due to the constant 24-hour per day use of equipment, starters would lock in place.

Neoprene welding cable held up well. It neither chipped nor cracked. The cool air surrounding the machines helped act as a coolant for the cable.

Heavy gloves worn by the welders so hampered their sense of touch that they would apply a torque to the triggers, causing them to twist and fail mechanically.

Filling the Gap—They solved the problem of welding in tight corners. They did this by brazing two 4-in. contact tubes together and sweating a ⅝-in. copper sleeve, 4 in. long, to the nozzle of the gun. This provided proper gas coverage.

Welding on yard panels was done outdoors, consuming about 52 pct of the total operation. Building panels took up another 42 pct of all work, both indoors and outdoors. The rest was indoor welding. This portion of the job sealed in radio-frequency emanations.

Construction at the BMEWS station is under supervision of the Corps of Engineers. The work is handled by Greenland Contractors and Danish Arctic Contractors.

Multiple Spindles Take Over Production of Camshafts

Sometimes automation between special machines is not the only answer to efficient output even with standard parts.

Combining several operations into one multiple-spindle unit can pay big dividends.

By R. H. Eshelman,
Machinery Editor

▪ Instead of tooling a series of special lathes in sequence, an automaker chooses a six-spindle unit that gives output equal to four automated lathes. It's a setup that spurs output of Valiant camshafts at Chrysler's engine plant at Trenton, Mich.

The plant gains substantial savings in floor space and capital outlay. It gets better runout tolerances on these critical parts, less scrap and closer control of operations.

To get into production of the new slant six, the Trenton plant had only minimum lead time. But the payoff with the new setup appeared so promising that National Acme Co., Cleveland, got the green light to develop a machine unit and tooling to do the job.

Quick Work — The six-spindle machine was designed, built, tested and installed for operation all in about a five month's period. Even before the machine was accepted, the builder ran off 6000 camshafts. These had to pass the usual rigid quality inspection at the Chrysler plant.

The machine now is in production shakedown phases. Plant manager, V. P. Masi, reports it's proving all that was expected. And he foresees an even greater payoff ahead. "The machine is new to our people, and we're not getting all the production yet we know we can," he says.

New Holding Setup—Key to success is the part holding and driving method. By holding in centers and driving from an offset hole, it's possible to expose the bearing journals. That allows turning the journal outer diameters, which couldn't be done in a chucking setup.

The critical problem of a long shaft with flexibility is one of centering, driving and containing it without deflection during turning. The new setup uses live centers with driving pins.

Driving centers allow holding tolerances. Steady-rest rolls under the bearings aid in keeping the shaft straight, minimizing runout and chatter, which is always a headache with a long span and little support.

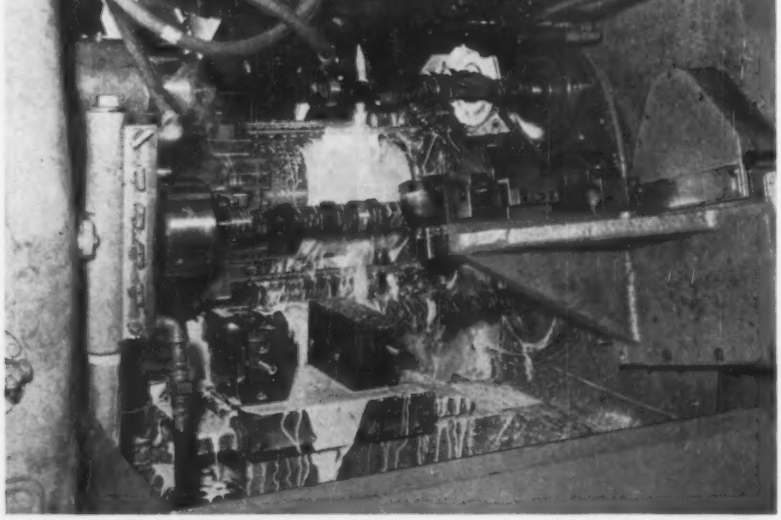
Acme engineers designed an air-operated snubber to maintain a constant pressure against the fifth position turning slide. It eliminates any vibration in the distributer gear section of the shaft, a critical area because of its distance from the centers.

Tough Material—For the Valiant, the camshaft is a high test ductile cast iron. The cam lobe areas are pre-hardened.

Although this area is not machined, the flame hardening does increase machining problems. Because of the high chrome and nickel content, the job is a tough one, probably no less difficult than on conventional forged camshafts. In fact, during development the tooling was planned to take either forgings or cast shafts.

To secure volume production, cutting bits are mostly the carbide throw-away type, square and diamond shapes. Only a single cut is taken on each of the journals and the distributor gear sections. Stock removal is about 3/16 to ¼ in. on diameter.

Save Operations—Tolerances on the finish turned main bearing jour-



COOLANT FLOOD: To promote chip removal on rapid cuts, and reduce possibility of chatter, soluble-oil coolant floods over carbide cutting bits.

nal diameter are ±0.003 in., and 0.002 in. on length. Critical tolerance, of course, is runout of the cam bearings which must be held to 0.002 in.

But in addition to holding these dimensions, the big gain with this machine is that it holds straightness within a couple thousandths also. It eliminates a former straightening operation.

Then too, the rigidity of the setup helps in facing the number one main bearing. This used to be only a rough cut that was finished by grinding for squareness.

Single Step—With this setup the operation is finished in a single step. The retractable tool slide faces down the side of the bearing. Then the tool retracts so as to avoid any swipeback marks on the cam face, making it possible to hold both squareness and finish requirements.

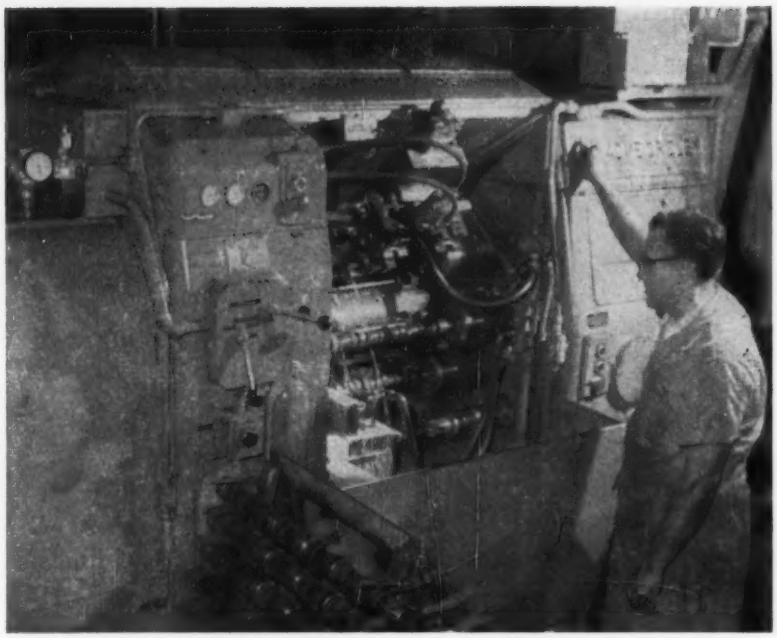
Plant tool engineers report also that they expect a definite savings in scrap, in addition to quality improvement. This can be expected from having an operator at the machine.

With automated setups you can pile up a sizeable scrap pile when something gets out of whack before you can get at the trouble or shut off the line. With this machine, the operator's work consists of loading and unloading parts. But since he is always within arm's reach of the controls, he can shut off the machine at once should tool breakage or other breakdown occur.

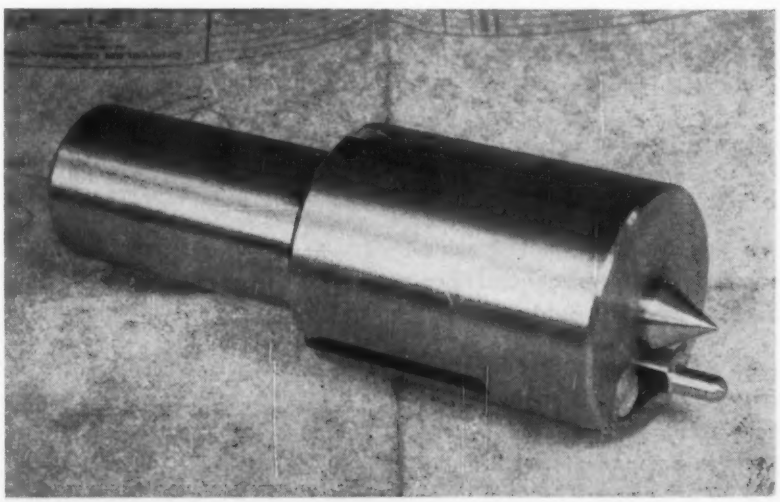
Usual Labor Costs — The unit piece labor costs are no more, in fact probably will prove to be less. That's because automated lines always require preventive maintenance, tool changing, setup time and repairs.

Manual loading and unloading in this unit means no lost production. Both are done in the first position, with operations continuing on parts in the other five machine spindles.

Despite the special tooling and some unusual machine arrangements, the unit is basically standard in nature. It means that merely by switching tooling and some setup changes it's possible to machine a variety of long, thin shafts.



FAST SEQUENCE: Operator merely snaps out one part, snaps in blank when six-spindle machine indexes. Tool slide operation is automatic.



PIN-TYPE CENTER: The most recent change to the unit is live pin-type center that makes it easy to load and unload without rechucking.

Key in Tooling Zone — Major differences from the standard six-spindle chucker are mainly in the tooling zone. It's arranged to give additional slides for turning and facing the various shaft diameters.

A center carrying block replaces the standard end-working toolslide. It's mounted on the normal spindle carrier stem to maintain positive alignment. And it's rigidly fastened to the spindle carrier face. The centers index with the spindle carrier.

For loading and unloading parts in position number one, the rotating center retracts, actuated by a hydraulic cylinder. The two standard lower cross slides are replaced by special compound slides that are independently cam operated.

IN VARIOUS LENGTHS: Cut lengths of channel for masts go through straightening by hydraulic jacks.

Revised Setup Takes Care Of Varied Production Flow

By **T. H. Olson**—Yale Materials Handling Div., The Yale & Towne Mfg. Co., Philadelphia

A decision to pull troublesome parts from general production flow has paid off.

The new setup handles these parts by using all equipment to best advantage, despite variations in components.

■ Materials handling units have to be as varied as the jobs they are intended to handle. This fact is reflected in the production setup in building lift trucks.

At Yale Materials Handling Div., there's not only the variation between product lines, but an additional variation in components to suit customer needs. This is particularly true with channels, attachment carriers and forks which form the heart of a lift truck's usefulness.

Ten different channel assemblies come in three standard channel heights. On top of this, four height variations exist to conform to capacity needs.

Set up Special Area—Because of these variables, the plant decided to break fabrication out of the general production flow. Channels, carriers and forks now have their own production area.

Of four parallel production lines, one each handles external (fixed) channels, internal (moving) channels, forks and carriers. Each of these lines builds subassemblies as well as receiving a few standard components from other departments.

Each line has its own equipment for machining, straightening, arc welding and other operations. Universal jigs and fixtures easily handle the wide variations.

Process in Sequence — It's not unusual for a dozen or more different channel lengths to be in process in sequence without interruption. Wherever possible, however, batches are naturally kept large.

An electric hoist with a plain trolley on a jib crane moves channel stock from convenient storage across an aisle to the conveyor servicing a power saw. From the saw, a roller conveyor passes each length through an eight-nozzle Pangborn shot-blasting machine.

This step removes mill scale from the inner surfaces on which channel rollers will bear. After shot blasting, the channels are straightened on a table which can take a wide variety of lengths.

Hydraulic Straightening — The table has two bridges, each fitted with a hydraulic jack exerting vertical pressure. Checking on the table is done by straight edge.

From the straightening table, channels separate into two parallel lines for inner and outer sections. Major drilling takes place at a station using a bed fixture that quickly clamps a pair of channels of any length in the required position.

Drill bushings on slidable hinged gates locate major holes. They're spaced longitudinally from bed recesses and locked into position to suit each piece.

Quick Setups—This enables the operator to make quick setups and drill rapidly, while holding correct spacing. A bench close to the fixture holds all tools needed.

Included are large fly cutters that face bosses against which flanged brackets are later welded. Gages to check critical dimensions are also at hand.

After drilling, channels are either returned to the conveyor or are delivered directly to a flange welder at the next station. In this welder there's a fixture for quickly locating the part.

Fast Welding Cycle—The roller bracket stud comes below a center held in the vertical spindle of the welder. A Lincoln Model LAF 2 welding head fastens the stud flange to the channel with an average welding time of 20 seconds.

Following bracket welding, channels go to a universal welding fixture, where other mating parts are hand arc welded. This fixture handles different lengths and transverse spacing. It's mounted on trunnions so that it can be turned to any position convenient for each weld.

Next in line is a straightening table. Adjustable jacks on moving bridges can apply pressure at any one or two points required.

At this point, gages not only check straightness, but also insure that all important dimensions are within limits. In some cases, hand grinders are applied to remove small amounts of excess metal on certain surfaces.

Bar Stock for Forks—Fork production starts at the same cut-off saw used for channels. Bar stock cut to desired lengths moves by hoist onto narrow roller conveyors which pass them into one of a pair of small gas-fired furnaces.

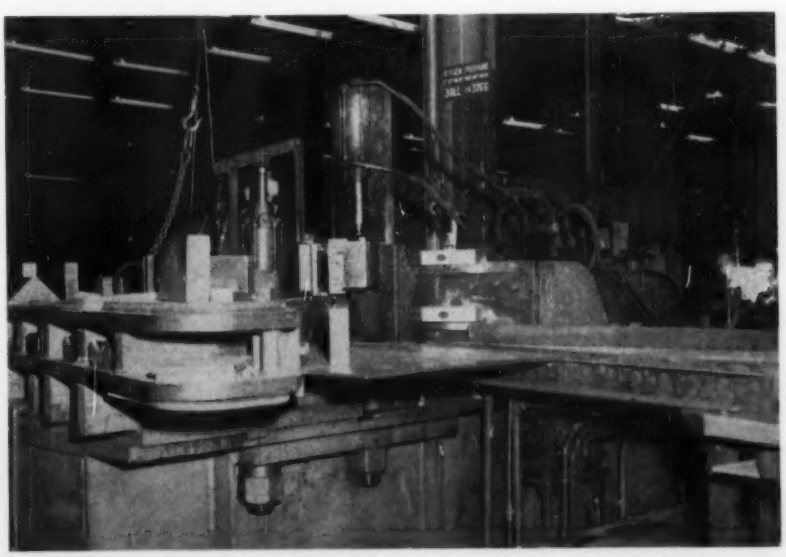
There are designed to heat only the portion of the bar stock which will be bent to form a fork. When this spot on the stock reaches 1650°F, the length is moved on another narrow conveyor into a precise location in an American Steel Foundries bulldozer.

A bend is made in two stages by two pairs of dies. In the first stage, there is a fixed die of fairly large inside radius and a punch having a large U-shape on the outside.

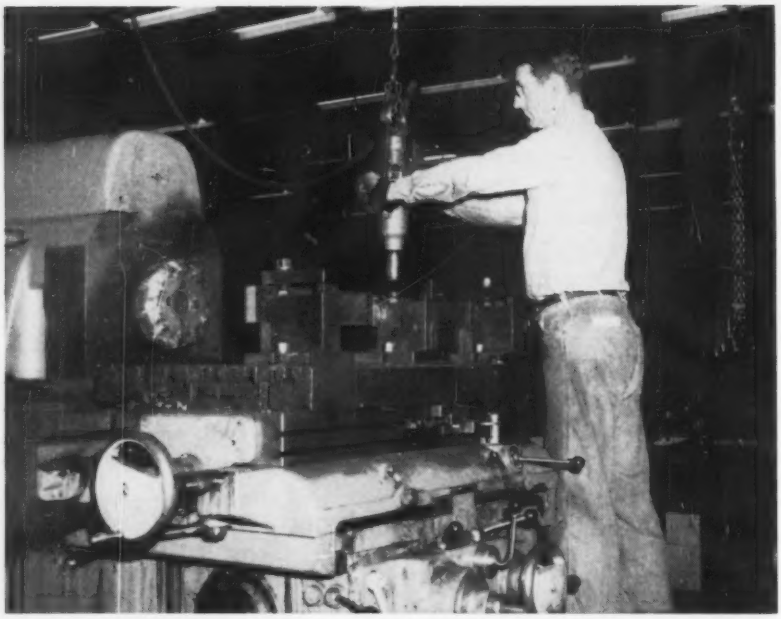
Punch Forms Legs—As the die closes, the horns of the U form the stock around the punch. It leaves the two legs of the fork at an included angle of about 85° at the end of the stroke.

After the dies open, air cylinders move them vertically to bring the second pair into working position. On this pair, the punch has a com-

FAST CYCLE: Automatic setup arc welds roller brackets around flanges in 20-second cycle. Parts are first located under center of rotating head.



TWO-STAGE BEND: Bulldozer setup forms the fork in the heated area of bar stock in two steps. Upsetting prevents thinning out at the bend.



SPEEDS CLAMPING: Using an air wrench speeds clamping a fork in the fixture. Blade cutter of milling machine produces required taper.

paratively small radius that determines the inside radius of the bend. The mating die has a special concave shape that forms the outside of the bend.

As the die closes, the two ends of the fork bear against spacer blocks which are set to determine the length of the fork legs. Further closing of the die with the ends of the fork legs confined causes an upsetting of material at the bend.

Upsetting for Strength — An important effect of this action is that the metal does not thin out. The metal of the fork adjacent to the bend is at least as thick as the original stock. Upsetting insures that the fork will have proper strength where, at the bend, the stress in service is highest.

A hoist with special tongs sets the bent fork on a roller conveyor. There the part cools during advance to the milling operation.

Customers usually specify that each fork be tapered over at least a portion of its length. Lengths and angles required vary, hence the tapers are cut in adaptable setups on a No. 5 Cincinnati Milling Machine with a 50-hp motor.

Carbide Cuts Taper—This machine uses an Ingersol 11-in. diam face milling cutter having 10 "shear clear" carbide blades. For this work, the fork of SAE 1035 steel is held to the bed by three universal fixture clamps tightened by air wrench.

Cuts are made at 15-¼ ipm bed speed and with the cutter turning at 126 rpm. Each cut is ⅜ in. deep and with 0.010-in. chip load per tooth.

Chips are uniform in size and blue color. Metal removal is rapid so that a vibrator chute is provided to catch and feed chips into a tote box.

Meter Shows Tool Wear — A meter indicates the power consumed in making the cut. When this power exceeds a given figure, indicating that cutters are becoming dull, the machine is stopped for a fresh cutter.

In general, one cutter can be used for about 4 hours between grinds, despite the high carbon steel being cut. In an average case, it takes about five cuts across the face to complete a taper.

After tapering, forged-steel hook-like lugs are arc welded to the vertical fork leg. It's done on a fixture that spaces the lugs correctly and also positions the fork for convenient welding.

Shape by Burning—At the next station another fixture holds each fork with its lower leg horizontal so that its outer end can be given a rounded or other specified shape by burning. In a pantograph setup the burning torch follows a template of the required contour.

While the burning proceeds, the operator uses an abrasive wheel to dress edges and faces of the prior piece. Completed forks return to the conveyor to pass in batches through a continuous heat-treating furnace and an oil quench.

This treatment insures maximum toughness and is followed by straightening in a hydraulic press and final inspection. Immediately after inspection all forks are run through a Wheelabrator shot blast to remove mill and heat treat scale, preparing the surface for prime paint.

Assemble Fork Carriers—On the fourth line in the production area, fork carriers are built largely from components made from plate in other fabricating areas. Fork carriers vary greatly in length and width as well as in design features.

Assembly is largely by hand arc welding. Positioners aid in bringing weldments into convenient welding positions.

Roller brackets are welded in the same automatic machine used for fastening brackets to channels. Immediately after welding, the carrier is straightened in a hydraulic press using straight edge and simple gages to insure accuracy.

Some drilling of fork carriers is required. In some respects, as for roller bracket bosses, for example, drilling is about the same as that on channels.

Fork carrier assemblies undergo straightening when needed. They advance along roller conveyor lines until, after final inspection, they are ready for transfer to final truck assembly.

NBS Expands Standards Program

Sample Materials Aid in Control of New Alloy Compositions

Currently, the NBS supplies more than 600 different standard materials—almost half are composition standards.

The number increases constantly to keep pace with development of new materials and alloys for the space age.

▪ Control of any material or process requires a set of standards. This is true in both quality control and research operations.

In quality control, you compare an item to a preselected standard. The standard may be a prototype or a set of measurements. A blueprint sometimes serves as the standard.

To develop new alloys or special metalworking processes, there's a need for a yardstick to measure the new method and its composition against a recognized set of values. Again, standards are required.

Known Standards — Recognized standards insure uniform measurements of chemical composition, heat and temperature. They also maintain accuracy in the calibration of instruments. These standards serve as guides in the control of metal alloy compositions.

The National Bureau of Standards maintains over 600 different standard materials. Trained personnel certify these materials either for chemical composition or with respect to a specific physical property such as melting point, viscosity, or index refraction.

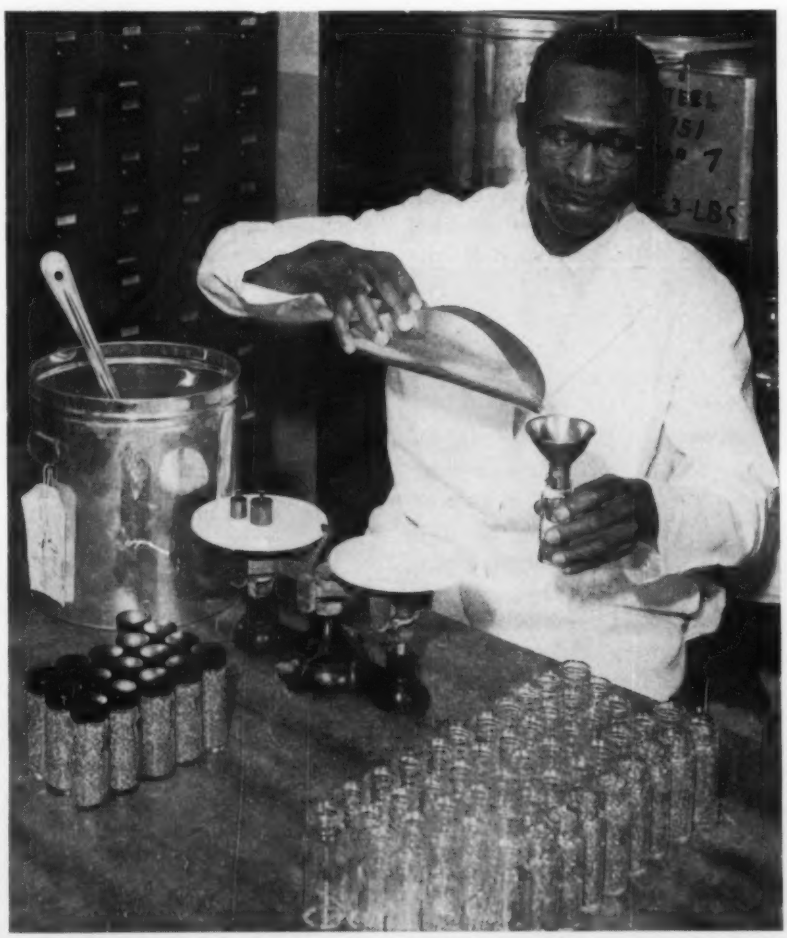
Within the past five years, requests from industry and science have brought about 70 new standards. Efforts to develop materials for use at high temperatures, or under other extreme conditions, cause most of the expansion.

Early Start—The standard samples program was established in 1905. At that time, four sets of cast iron were standardized for chemical composition.

Today, the Bureau maintains chemical standards for both pure metals and various alloys. These standard samples serve as monitors for the thousands of analyses made daily in industrial laboratories. In fact, the NBS distributes—to control laboratories—over 60,000 samples of standards each year.

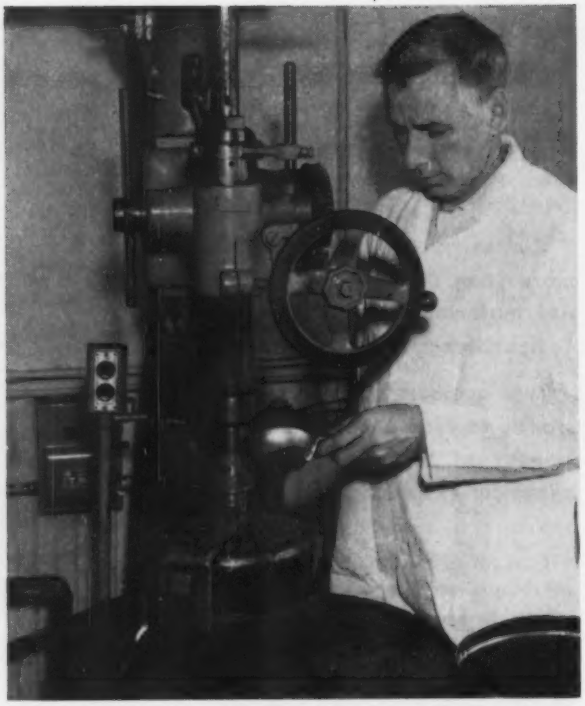
Standards of chemical composition also help to determine the composition of unknown substances.

New Standards—Whenever an industrial need develops, new chemical standards are prepared. Recent additions include: high-temperature, cobalt-nickel alloys for jet and missile production; titanium alloys for aircraft and ordnance research; zirconium alloys for nuclear-power development; lithium ores for the new lithium chemical industry; and lead-tin bronzes for defense purposes.



READY FOR USE: After analysis, Bureau personnel pack standards in bottles for distribution to industrial control laboratories.

MATERIAL ANALYSIS: Potentiometric titration determines chromium, vanadium and manganese content.



CRUSHING THE CUTTINGS: A grinder breaks up the chips—machined on a lathe—into finer sizes.

Another new set of standards consists of seven types of steel. The exact oxygen and nitrogen content of each is known. These reference steels aid in the calibration of analytical equipment.

The equipment determines the gaseous elements in various commercial steels. Low gas content is present in metals with desirable properties. In the future, buyers may someday specify the maximum amount of gases present in a metal.

With the certification of such standards, the Bureau begins a program to produce gases-in-metals standards. Work, now in progress, will develop standard samples that are certified for oxygen and hydrogen content in titanium alloys.

Spectroscopic Standards — Producers and consumers of metal products have used high-speed spectrochemical methods of analysis. These methods are basically comparison techniques. The spectra from unknown samples are referred to the spectra from samples with a known composition. Thus, again, standard samples play a basic role.

To date, more than 120 of these composition standards are available. Present plans call for 110 additions. Metals and alloys for 44 of the newcomers are now being analyzed.

This program satisfies requirements for common materials such as cast iron, steel and copper-base alloys. It also provides standards for newer materials — including high-temperature alloys, titanium alloys and zirconium alloys.

Trace Elements — Minute amounts of certain elements are added to some alloys. These trace elements improve specific physical properties. The heat-resistant alloys used in rockets and jet engines contain various combinations of boron, tungsten, molybdenum, titanium, zirconium, niobium and aluminum.

Because of the complex composition of these materials—and difficulties in chemical analysis—spectrographic and X-ray methods must control their quality in production. The NBS prepares standards which are certified for trace elements as well as major metals.

Double Check — Spectrographic and X-ray methods sometimes team up to control quality. Small amounts of certain elements, as well as major constituents, show up fast.

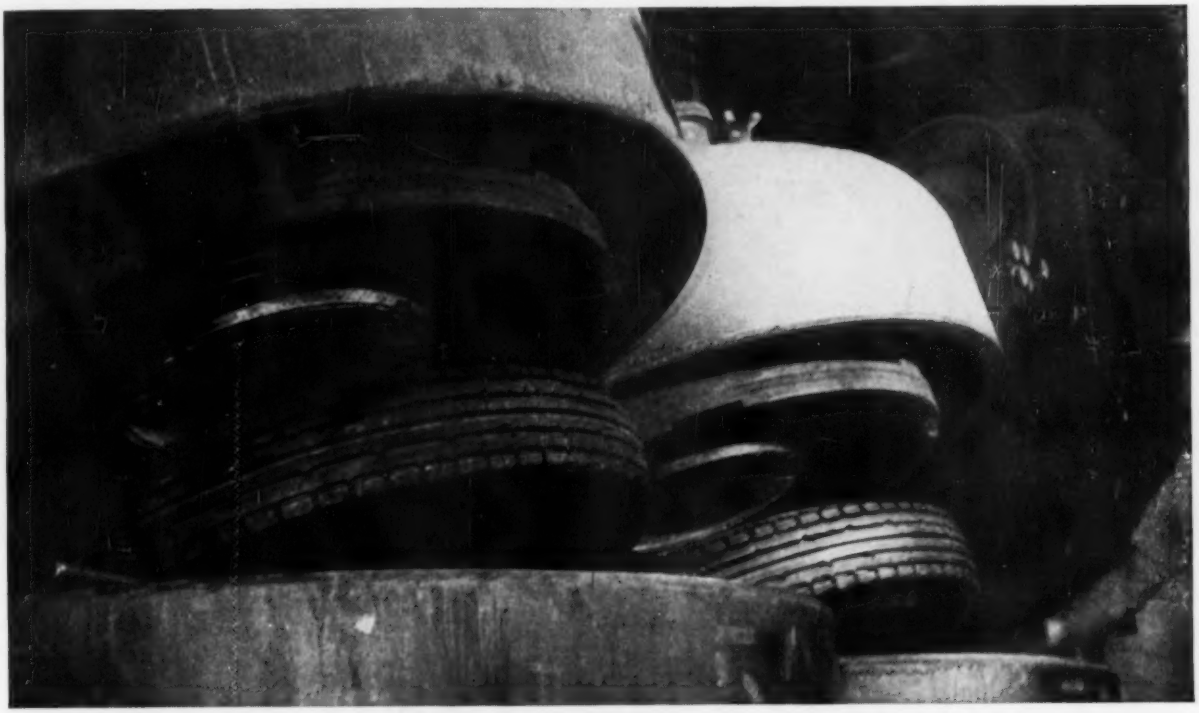
Rapid analyses of trace elements require the use of X-ray fluorescence. Like optical-emission instruments, these X-ray instruments need standard samples for their calibration.

Many spectroscopic standards can be used for X-ray fluorescence analysis. To date the Bureau provides 14 standards which were developed specifically for X-ray fluorescence.

About 30 more elements are under investigation in this set. Many of the newcomers are in the parts-per-million level.

Radioactive nuclides and uranium standards meet widely varying uses. Cobalt-60 checks flaws in casting parts or shell castings. Other nuclides determine food contamination and ages of wines or liquors. Several aid in the medical treatment of leukemia and cancer.

THE U.S. TREASURY SALUTES THE RUBBER INDUSTRY



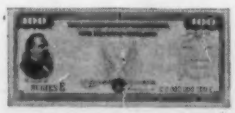
and its people who buy Savings Bonds and strengthen America's Peace Power

Americans who work in the rubber industry are proud of the rapid strides being made in their field, both in volume and in variety. Automotive rubber products and molded and mechanical rubber goods show constant gains in quality and quantity. Further, the rubber industry has done pioneer work in such novel applications as moving sidewalks and collapsible tanks for liquid storage.

People who work in this 7 billion dollar industry are proud of another thing, too: the help so many thousands of them are giving to America's Peace Power through the purchase of U. S. Savings Bonds. By regular purchases of Shares in America, these patriotic and forward looking people are reinforcing their own security after retirement. By this means they establish reserves for emergencies as well as for long range family projects, like education and home building.

If your company has not, thus far, set up a Payroll Savings Plan, you can start immediately. Just telephone your State Savings Bonds Director and accept the help he is anxious to give you. Or write to Savings Bonds Division, U. S. Treasury Department, Washington, D. C.

Harold E. Kalb is shown here at his work in one of the great manufacturing plants of the rubber industry. Like many thousands of his fellow craftsmen, Mr. Kalb is using his company Payroll Savings Plan to contribute regularly to the Peace Power of his country.



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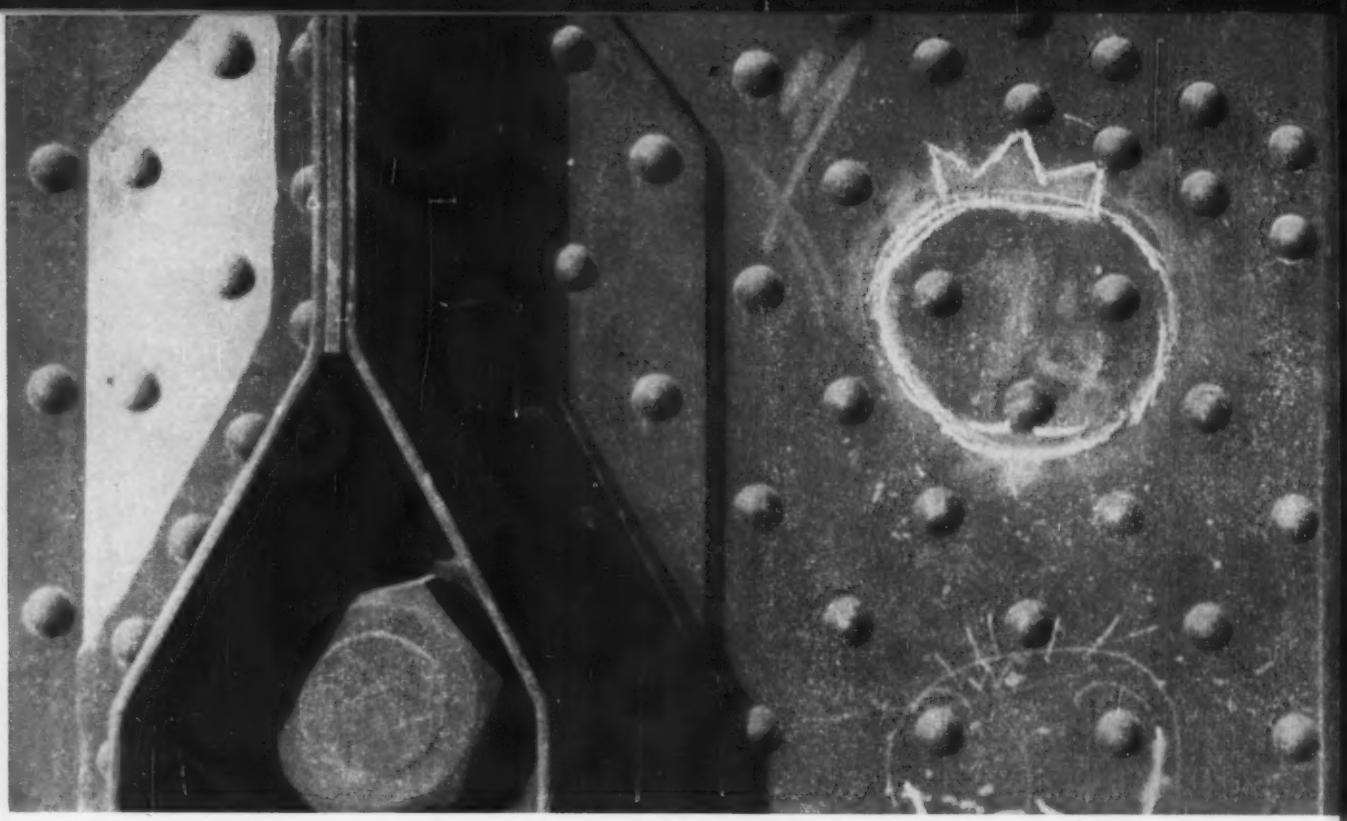

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The strength inherent in steel, like that of a mythic king was grasped by a small child's art and enscribed on a broad beam of an old bridge. And old too are the methods employing unsightly rivets; new welding techniques, and the newest industrial methods produce steel beams and structures that are light and strong, and wholly free of disfiguring, heavy rivets. Progressive designers everywhere acknow-

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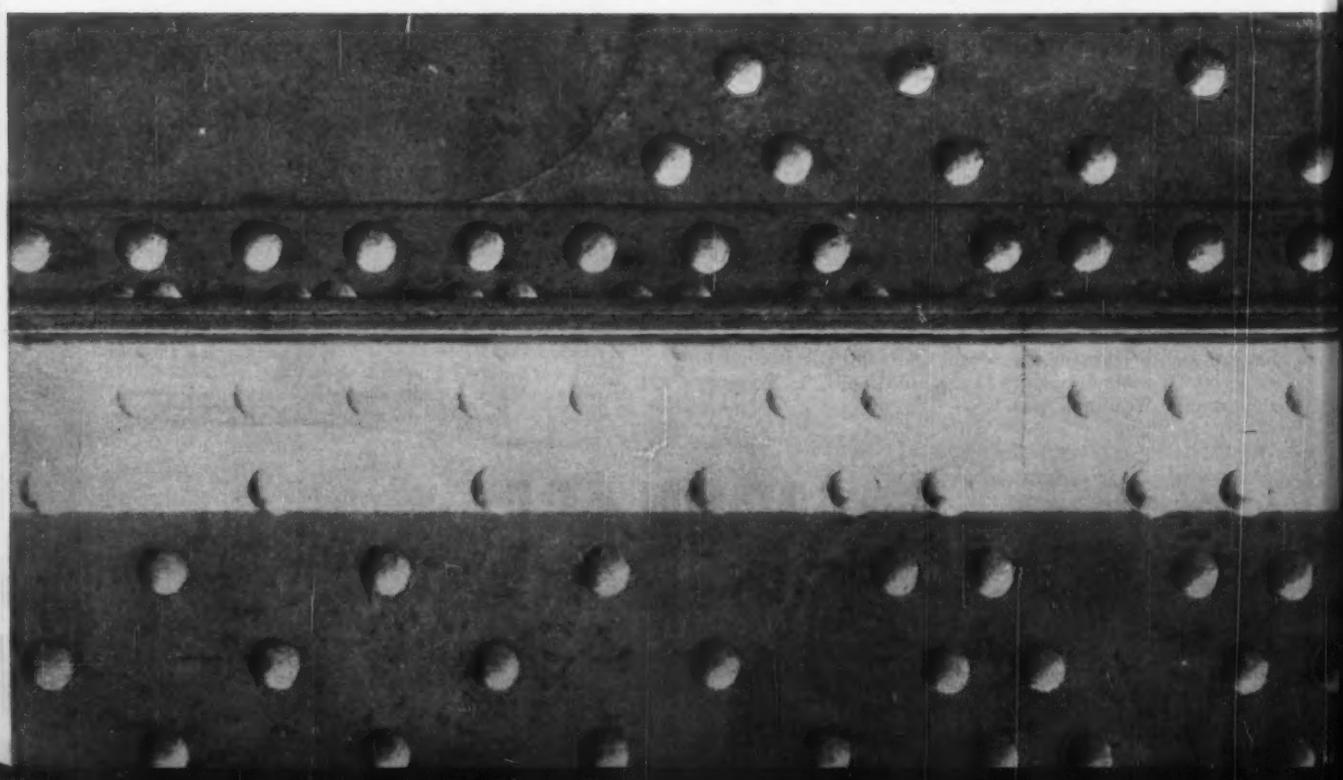

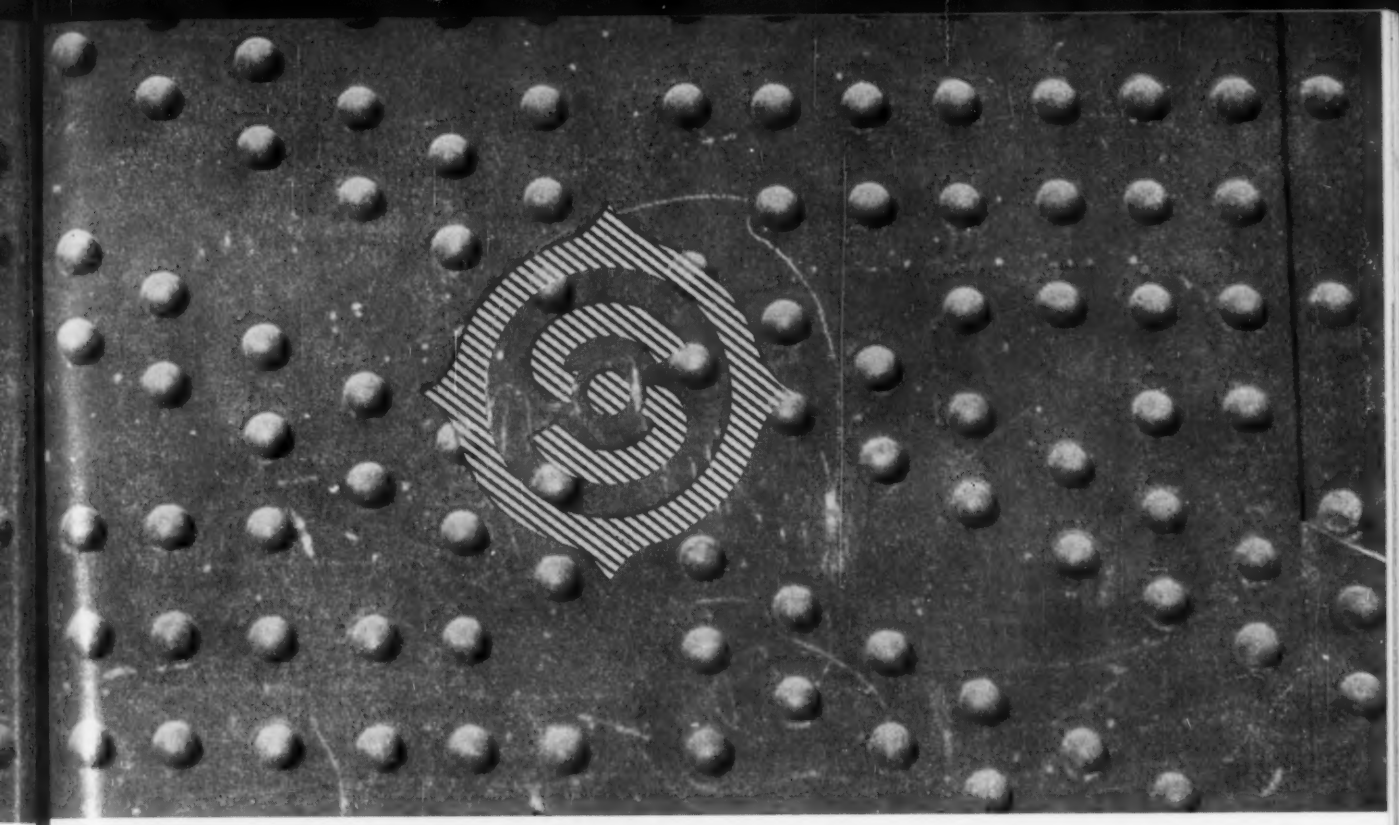

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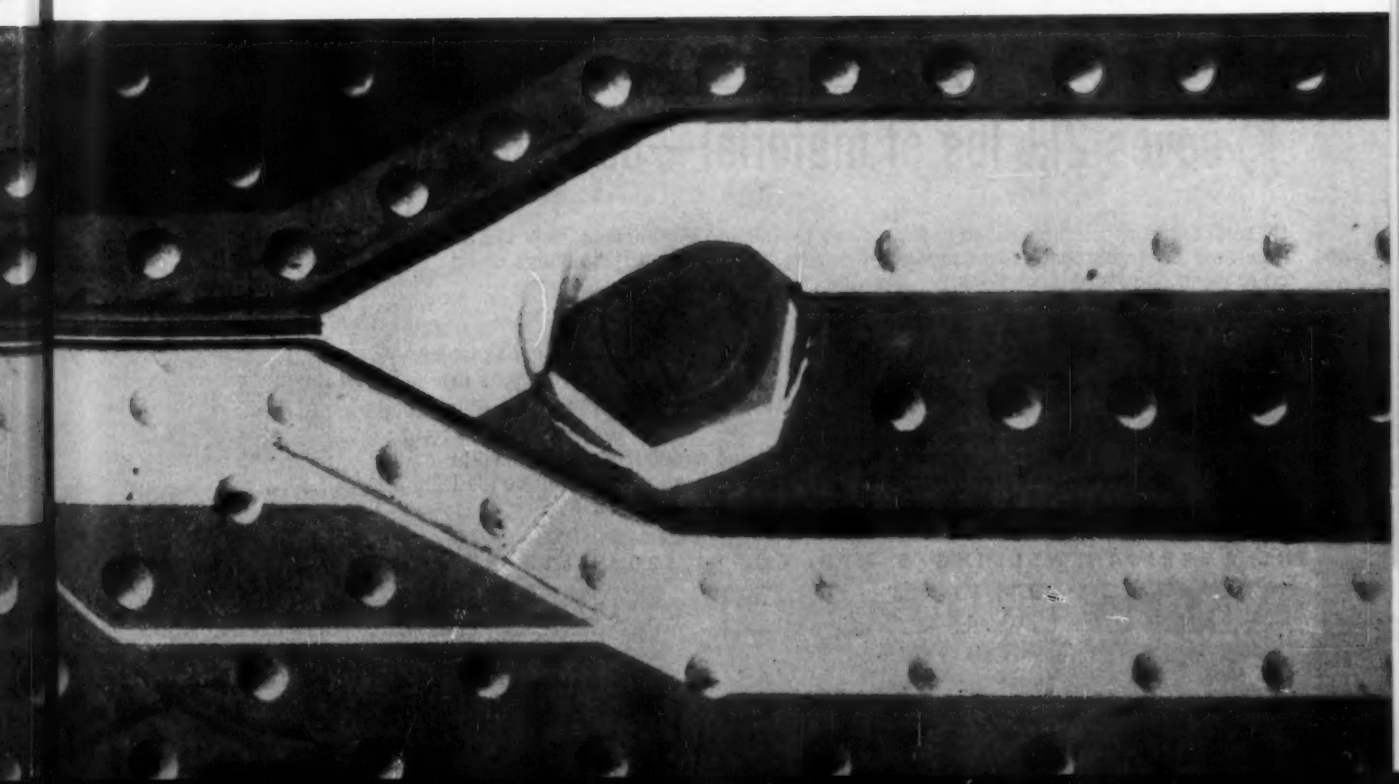

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By selecting a special mill-rolled section close to finished dimensions, only 1/3 as much material was required to produce this ring. (Similar material savings could be realized on extruded sections.)

In addition, 45 minutes of expensive machining time were eliminated.

Flash butt-welded rings like this have been used in critical applications such as jet aircraft engines and present day missiles. They offer cost saving advantages in many fields, particularly where stainless or other heat or corrosion-resistant materials are employed.

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An eight-page bulletin describes a complete line of soldering irons. Features include light weight, calorized and ironclad tips, and tubular heater. Case histories of cost savings are included. (General Electric Co.)

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Blasting Abrasives

Important features to be considered in selection of steel blast-cleaning abrasives are outlined in a 20-page booklet. Details on the manfacture of a line of such abrasives are included. (Pangborn Corp.)

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Stainless Chart

A data chart compares properties for 18 different grades of stainless steel, including 17-4 PH and 17-7 PH grades. It is designed to aid selection. (Peter A. Frasse & Co., Inc.)

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Beryllium Oxide

A brochure describes in detail the properties, fabrication, and various products of beryllium oxide. These include powder, crucibles, crucible wash, and shapes. The unusual properties of this refractory material meet many of the stringent demands of the nuclear, electronic, aircraft, metal, and ceramic industries. (The Beryllium Corp.)

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Material Handling

A wide line of material-handling devices is presented in a 16-page booklet. It includes overhead traveling cranes, monorail systems, vacuum handling systems, and a road and rail freight-car mover. (Whiting Corp.)

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Floating Toolholders

A complete line of full-floating toolholders is cataloged in a four-page bulletin. There are general-purpose, tap-holder, and threaded adjustable types in 51 models. (Burgmaster Corp.)

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Shear Knives

An illustrated brochure describes a full line of shear knives for all metalcutting applications. Made from tool-steel alloys formulated especially for specific applications, they are capable of shearing metals of all thicknesses from aluminum foil to heavy steel plate. (American Shear Knife Co.)

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Layout Machine

Using an altogether new concept in layout work, a machine can quickly lay out vertical and horizontal, inside and outside lines on castings and workpieces in one easy, accurate operation. It is well suited to checking hole centers, finish allowances, and casting clean-up. It's described in a folder. (Portage Double-Quick, Inc.)

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Black-Oxide Finish

An "activated" substance for producing a black-oxide finish on steel is described in a four-page product bulletin. It will blacken many types of hardened and passive steels which formerly were finishing problems. (The Mitchell-Bradford Chemical Co.)

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Radius Former

A folder describes a radius cutter which cuts a wide variety of concave and convex shapes. It can be

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Overhead Conductors

A bulletin describes a bar conductor system for overhead-trolley material-handling equipment. Double-insulated, it features maximum safety and very long life. (The Cleveland Crane & Engineering Co.)

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New Printing Method

New techniques used to produce printed matter from punch cards and to store pages on microfilm are discussed in a 12-page reprint. Heavily illustrated, it takes the reader through all steps and lists the equipment used. Possible applications by industrial firms are discussed. (The Filmsort Co.)

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New Tool Materials

Issue No. 9. 1959, of "Grits and Grinds" contains an article on applications of VR-97 ceramic tools to high-speed machining of cast iron and heat-treated alloy steels, and a story on the use of diamond wheels to grind high-vanadium tool steels. (Norton Co.)

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Process Equipment

Numerous types of equipment for process industries are covered in a 32-page catalog. Included are compressors; vacuum, centrifugal, axial-flow, and turbine pumps; valves for fluid flow; crushers and grinding and roller mills for disintegration, mixing, and agglomeration; vibrating and gyratory screens for dry separation; blade mills, pool washing screens, and log washers for liquid separation; and kilns, dryers, slakers, pelletizers, coolers, and liquid heaters for heat transfer. Also covered are electrical equipment, electronic metal detectors, water conditioning equipment, and various material-handling items. (Allis-Chalmers)

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Gear Generators

A 32-page bulletin describes and illustrates the complete line of Farrel-Sykes gear generators. Complete specifications and application data on all models are included, along with information on auxiliary equipment. (Farrel - Birmingham Co., Inc.)

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Mechanized Hardfacing

Mechanized hardfacing is the fast, economical method of applying protective alloy coatings to wearing parts on a production basis. The process, and a complete line of equipment for it, are described in an illustrated 26-page booklet. (Haynes Stellite Co.)

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Barrel Finishing

A special edition of The ABRASIVES' WORKSHOP describes a new system of controlled barrel finishing. It includes a complete selection of media, new compounds, and newly designed machines for every operation. Great cost savings are stressed. (The Carborundum Co.)

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Post-Tension Concrete

Post-tensioning for prestressed concrete is covered in a 16-page engineering bulletin. Force calculations, placement plans, tendon and anchorage assemblies, stressing equipment, and labor procedures are all covered for cast-in-place and pre-cast post-tensioned concrete construction. Applications are illustrated. (Joseph T. Ryerson & Son, Inc.)

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61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90

If you want more details on products advertised in this issue fill in below:

Page .....Product .....
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INVALID WITHOUT COMPANY NAME—
TYPE OR PRINT

Name .....
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Product Manufactured .....
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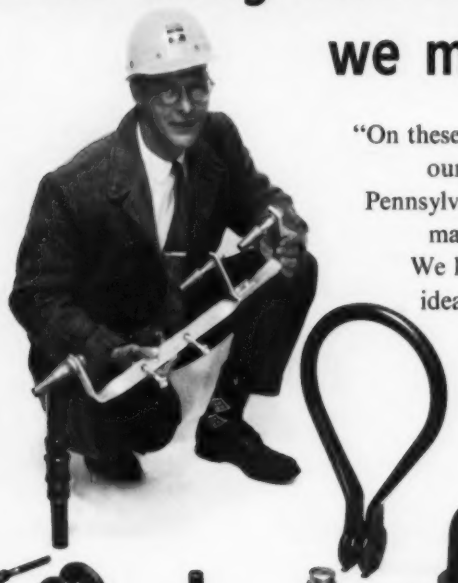
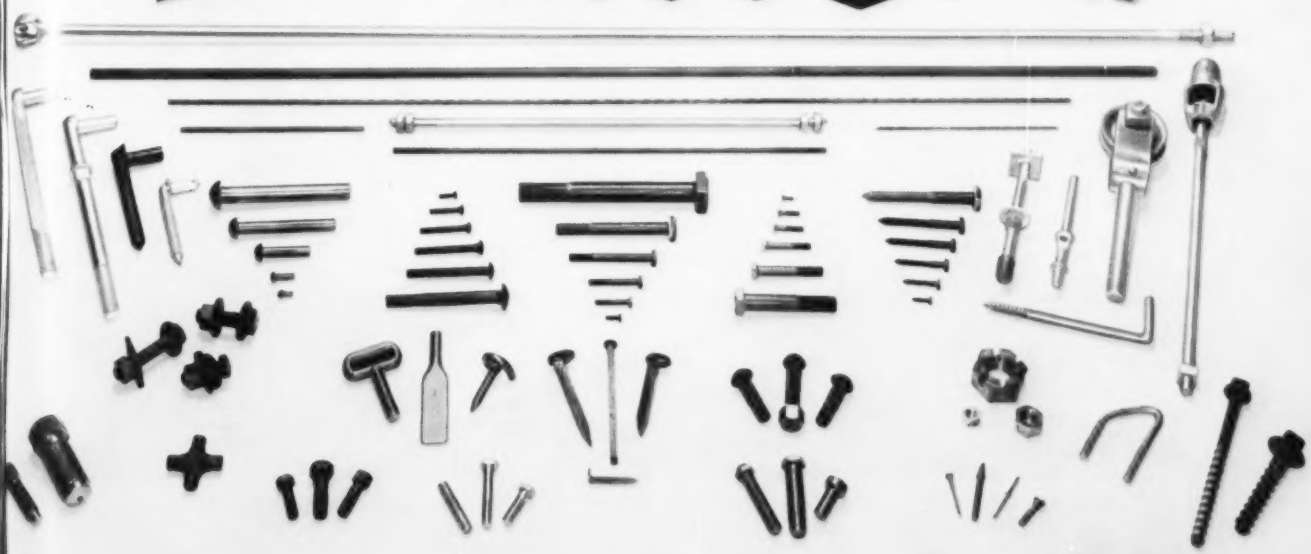
"Come along with me and see how we make fasteners"



"On these pages you'll see a few highlights of our largest fasteners plant at Lebanon, Pennsylvania. This entire plant is devoted to making standard and special fasteners. We hope this quick tour gives you some idea of our size, the products we make, and how we make them."

(In addition to our plant at Lebanon, Pa., other Bethlehem fasteners plants are located in Los Angeles, South San Francisco, and Seattle.)

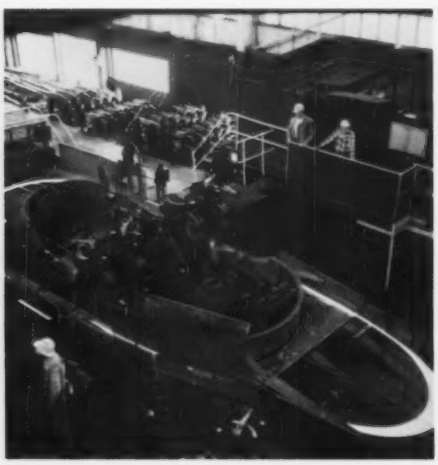


BETHLEHEM STEEL

BETHLEHEM STEEL

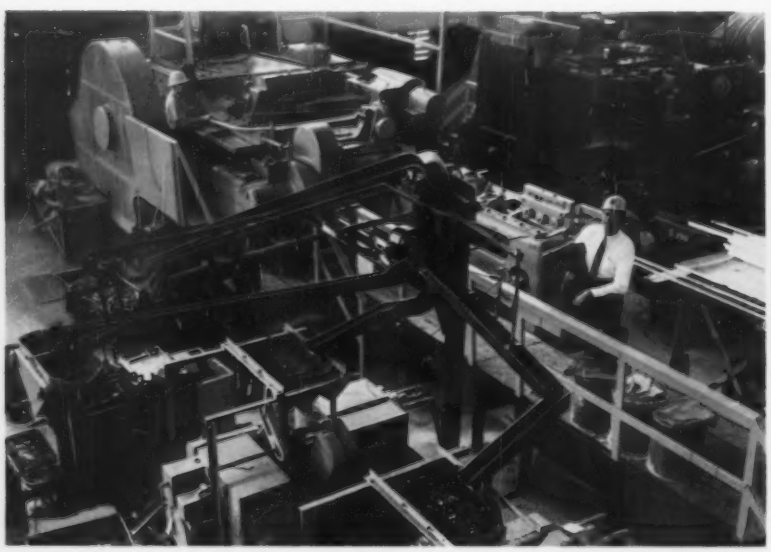
"16,000 tons each month of standard and special fasteners. That's how much this plant can produce!"

1. "Bethlehem controls every step in the manufacture of fasteners—even the mining of the iron ore. Our billets—we stock some fifty different grades at Lebanon—come from three nearby Bethlehem steelmaking plants."

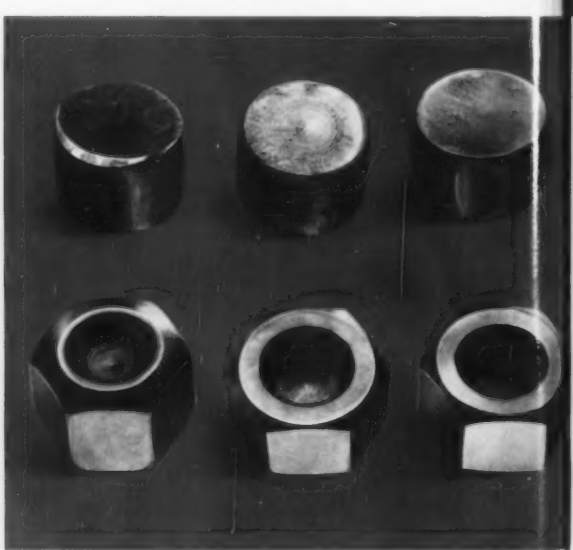


2. "This ten-inch continuous mill rolls the billets into straight bars, coiled bars, or coiled rods."

3. "Bolts can be made *hot* or *cold*. But before you can feed cold steel into an automatic bolt-making machine, the coils must be pickled to remove scale, and limed to provide a base for wire-drawing compounds."



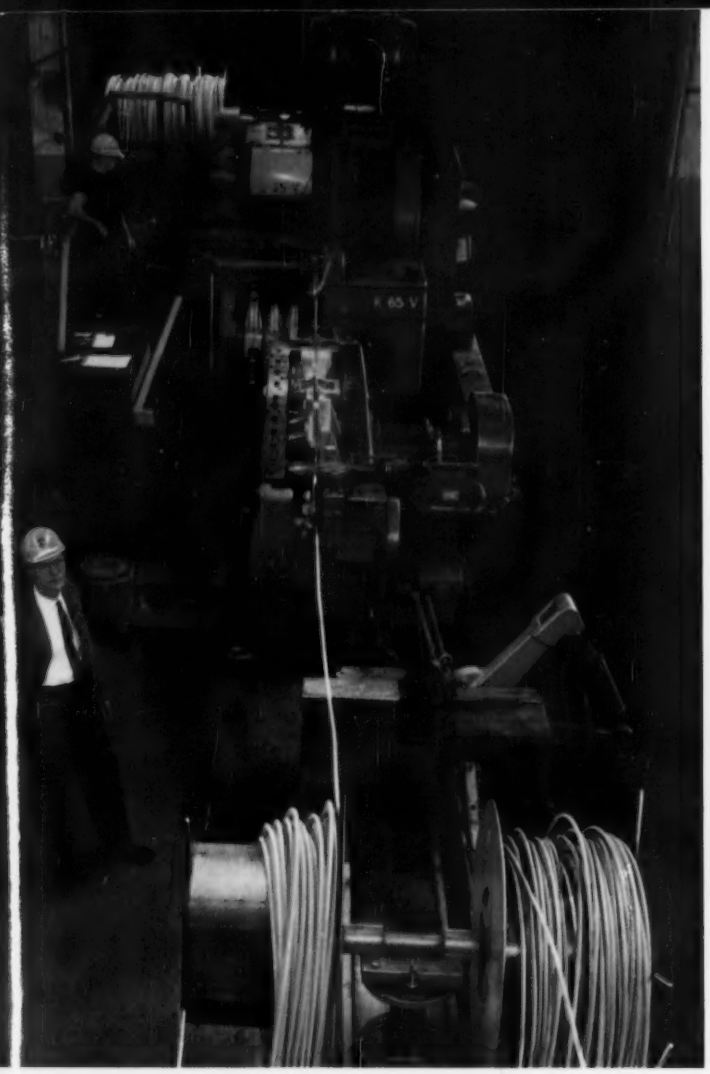
6. "Like bolts, nuts can be made either *hot* or *cold*. This cold nutformer makes ⅞ and 1-inch nuts. Other cold nutformers make nuts down to ¼ inch. Our hot nutformers make nuts up to 2 inches. We also make nuts by other processes up to 4 inches."



7. "Here's how a cold nutformer works. After the steel is drawn, the nutformer shears off a blank, flattens it, forms a partial hex, indents and expands to a full hex, finish-forges, and punches out the core. The nut is then tapped automatically."

BETHLEHEM STEEL

BETHLEHEM STEEL



4. "This particular boltmaker takes in coiled steel at one end, and ejects fifty finished, cold-headed bolts at the other—*every minute*. We also have batteries of hot-headers, and other cold-headers. All these machines are flexible—can turn out both standard bolts and special types of fasteners."

5. "How does a boltmaker work? A coil of steel is fed into the machine, and drawn through a die which sizes and straightens it. Then the machine shears off a blank, upsets it, heads it, trims the head and extrudes the portion to be threaded, points the bolt, and rolls the thread."

8. "Many customers require fasteners with improved mechanical properties. We're well-equipped for either batch-type or continuous-process heat treatments, as well as for selective surface induction hardening of fasteners."

9. "Our hot-galvanizing and electroplating departments are the most modern in the industry. All our standard and special products, with very few exceptions, can be hot-dipped in zinc or aluminum, or electroplated with zinc or cadmium."

"These modern facilities—plus many special-purpose machines for forging, threading, punching, bending, machining, grinding, and drilling—turn out one of the widest varieties and greatest tonnages of industrial fasteners of any one plant in the world."

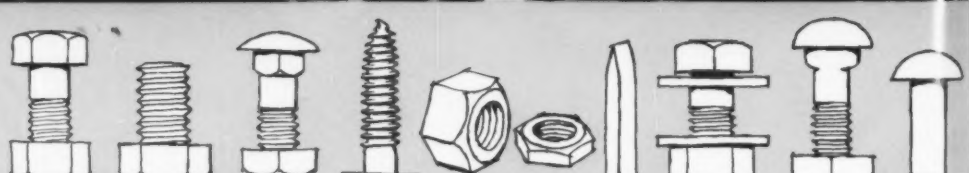
BETHLEHEM STEEL

"Quick delivery from stock"

"Standard fasteners—bolts and nuts, rivets, track bolts and spikes, construction materials—are in stock and ready to go. What you see below represents *less than ten per cent* of our stock of fasteners at Lebanon. It's easy to see why we're often able to ship your order the same day you place it.

"Special fasteners are also a big part of our production at Lebanon. We're set up to make them fast. And our fasteners engineers will be happy to help you with your special fastener designs."

"How do you get a shipment underway? Just get in touch with the Bethlehem sales office nearest you."



PUBLICATIONS DEPARTMENT M-9
BETHLEHEM STEEL CO., BETHLEHEM, PA.

Please send me Booklet 537, Industrial Fasteners—List Prices, Packing Quantities, Weights.

Name_____

Company_____

Street_____

City_____ Zone____ State_____

Folder 706 5911, Printed in U.S.A.

Bethlehem Steel Company, Bethlehem, Pa.

Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

New Materials and Components

New Die Steel Permits Difficult Heading Job

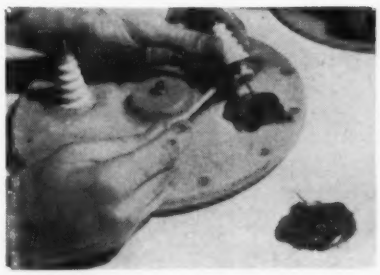
Changing die steels simplified an almost impossible cold-heading job. Making studs for auto ball-joint suspensions out of 8640 tool-steel wire, dies cracked under the 12,000-lb interference fit. The result was numerous rejects, short tool life, and excessive downtime for die replacement. Even worse, the former material often deformed in 1840°F heat treatment. The solution was a high-carbon, high-chrome, air-hardening die steel used for many cold-heading operations. After the change, production increased more than 15 times. (Allegheny Ludlum Steel Corp.)

For more data circle No. 19 on postcard, p. 65

Plastic Adhesive Features Nonmetallic Base

Adhering to most metals, a plastic adhesive has a nonmetallic base. Specifically developed for electronic uses where metallic-filler adhesives are not acceptable, it is intended for watertight and oiltight repairs on metals and other materials where non-conductivity and resistance to acids and alkalis are needed. It shows superior adhesive qualities with iron, steel, aluminum, wood, glass, concrete, and resin laminates. With steel, it tests up to 3000 psi tensile shear. (Crompton & Knowles Corp.)

For more data circle No. 20 on postcard, p. 65



Brazing Saves 40 pct in Servo Valve Housing

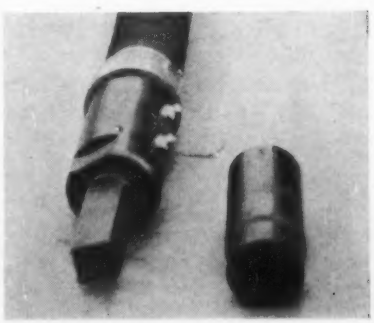
Redesign of a stainless-steel servo valve housing to use furnace brazing saved 40 pct of the cost of machining from bar stock, which was expensive due to internal shoulders and flanges. Now it is made as a brazed body and cover assembly. The body is made from tubing, and the cover from bar stock, both on screw machines. The cover is a press fit. The ring is serrated to provide space for the brazing alloy, providing optimum brazing joint clearance in the finished assembly. (Wall Colmonoy Corp.)

For more data circle No. 21 on postcard, p. 65

Flexible Shafts for Extra-Heavy Duty

New flexible shafts carry high power over a path complicated by any number of bends. One with 1-in.-diam core handles 760 in.-lb torque at 600 rpm. A 1¼-in.-core model takes 1650 in.-lb at 500 rpm (about 10 hp). The core is made of layers of tightly wound music wire. The casing is lined with spring steel, reinforced with wire braid, and covered with fabric and a rubber jacket. A square slip coupling has enough play to take care of slight changes in length due to varying torque loads. Any length can be ordered. (Stow Mfg. Co.)

For more data circle No. 22 on postcard, p. 65



Here's why you save $60 in maintenance a

Ordinary brakes need frequent adjustment . . .

Ordinary magnetic brakes require periodic adjustment to compensate for wear . . . industry average is once every two weeks. New Westinghouse SA brakes are completely self-adjusting . . . automatically adjust themselves *during* operation. Once they're installed, you never have to touch them. This means you save at least $60 per year per brake *in maintenance alone.* And that's not all . . .

a year with every Westinghouse SA brake

Westinghouse SA brakes adjust themselves . . . automatically

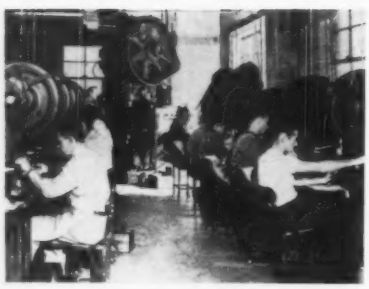
Westinghouse magnetic brakes also offer you these important benefits: 1) dust-tight enclosure which eliminates cleaning of dust, dirt and metal particles . . . 2) automatic self-alignment which substantially reduces installation time . . . 3) safe, sure protection against dragging shoe tips and uneven lining wear, eliminating costly replacements.

Ask your Westinghouse representative about the many ways this new brake can benefit you. Or, write Westinghouse Electric Corporation, P.O. Box 868, 3 Gateway Center, Pittsburgh 30, Pa. Ask for Booklet B-6548. J-22114

YOU CAN BE SURE...IF IT'S

Westinghouse

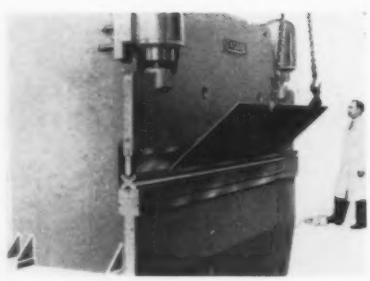
New Equipment and Machinery



"Rapid-Phase" Tooling Eliminates Cost Risks

A new tooling method for stamping permits testing new product design and market potential before setting up expensive permanent tooling. Called "rapid-phase," it breaks down tooling into individual stamping operations, to permit using tools and dies already in stock, with new dies only a minor part of the tooling. Production cost is slightly higher owing to additional operations, but overall costs are always lower up to 10,000 pieces. Specifications available include blank size to 14 x 20 in., ⅜-in. thick, up to 400-ton pressure. (Federal Tool and Mfg. Co.)

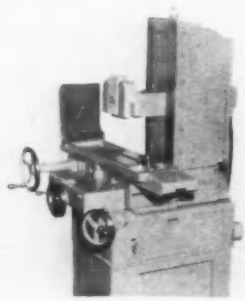
For more data circle No. 23 on postcard, p. 65



New Line of Hydraulic Press Brakes

In 44 models, a new line of hydraulic press brakes offers capacities from 200 to 1000 tons. Bed and ram lengths run from 9 to 24 ft. They feature a unitized hydraulic system, simple ram leveling and tilt control, and self-aligning ball joints with renewable seats. Laminated, non-metallic ways are used. The deep, rigid bed is interlocked with the frame. Top and bottom stroke stops are adjustable, and a movable foot switch permits operation from any position. (Niagara Machine & Tool Works)

For more data circle No. 24 on postcard, p. 65



Hand-Feed Surface Grinder Built for Precision

The latest addition to a line of precision surface grinders, the Model No. 7A is a 6 x 12-in. hand-feed machine. It comes with a ¾-hp, 3600-rpm direct motor driven spindle, or with a 1-hp, 3600-rpm spindle optional. The spindle is a super-precision ball-bearing cartridge type, spring-preloaded for automatic removal of any radial or axial play that might develop. The bearings are grease-lubricated and sealed to prevent the entry of grit or foreign matter. Also, the motor is enclosed and guarded within the rigid spindle head standard. (Covel Mfg. Co.)

For more data circle No. 25 on postcard, p. 65

Billet Shear Has High Capacity and Speed

A heavy-duty bar billet shear has the capacity to shear 4-in. round or round-corner square stock. Production rate is 32 strokes per minute for 6-in.-long billets, or 25 spm for 8-in. billets. Billet weight is held within 3 oz, and length within 0.020 in. Minimum lengths that can be sheared are 75 pct of the stock's diameter. Operation is completely automatic. The machine uses a power conveyor, length gage, outboard support, holddown, and automatic lubrication. Manual operation can be selected for single-stroking or inching. (Verson All-steel Press Co.)

For more data circle No. 26 on postcard, p. 65

The Iron Age Summary

Inventory Buildup A Top Problem

Estimates vary all over the lot over chances of building up a good inventory in the first half.

But at best, it will be tough. Sheet and tinplate, in particular, will be hard to get well into the second quarter.

▪ Building workable stocks of steel is the biggest single problem facing steel users at the start of 1960.

Only record production and shipments of finished steel will enable the metalworking industry to meet its own production schedules. Most steel-consuming industries are setting their sights at record or near-record output early next year.

Inventory Estimator — Contradictory estimates of first half steel availability only add to the confusion and uncertainty of steel supplies.

One extreme: Steel inventories are expected to jump 9 to 10 million tons in the first half.

Another: Shipments of finished steel during 1960 are estimated at 93 million tons against consumption of 86 million tons. Even though this would mean record shipments, it means inventory buildup of only 7 million tons during the year.

The Real Story—This is closer to the real picture. If shipments of finished steel do hit 93 million tons (out of an estimated 125 to 130 million ingot tons produced), this will be about 9 million tons above the previous record set in 1955.

A predicted buildup of 9 to 10 million tons in the first half could be misleading. Based on record production rates of steel users, steel in pipelines and in-process can reach millions of tons. It does not necessarily reflect stockpiled steel or steel in storage.

No T-H Cleanout — Looking ahead to the end of the 80-day Taft-Hartley injunction, steel mills are not likely to go through a big cleanout operation before the next strike deadline of Jan. 26. Feeling is that any new strike would be short-lived. Nothing would be accomplished by a big push to ship everything possible at the expense of in-process steel.

With the inventory buildup drive in full effect, sheet and tinplate may be tight in the second half of 1960, but premium buying should be unnecessary by then. For only a few products is there any space open in the first half. Already, there is some talk about booking sheets for the third quarter.

Carryovers Lengthen — Although not much is said publicly, there have been some mill difficulties and furnace breakdowns. This means there is danger that carryovers may be higher than anticipated. This, in turn, means that first quarter allocations may be further reduced. However, this is not uniform and depends on the steel producer involved.

With automotive production set for quarterly records, some parts suppliers are having trouble keeping up with demand from automakers. A lot of premium-priced steel is now going to hard-pressed auto parts makers.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,661	2,732	2,491	1,840
Ingot Index				
(1947-1949=100)	165.7	170.1	155.1	114.5
Operating Rates				
Chicago	95.5	96.0*	87.0	84.0
Pittsburgh	96.0	97.0*	92.0	60.5
Philadelphia	100.0	102.0	92.0	69.5
Valley	89.5	92.0*	86.5	43.0
West	89.5	94.5*	77.5	80.0
Cleveland	94.0	99.5*	87.0	74.0
Detroit	93.0	98.0	92.0	67.0
Buffalo	107.0	107.0	100.0	66.0
South Ohio River	88.0	100.5	97.5	85.5
South	89.5	86.5	83.0	72.0
Upper Ohio River	94.0	93.0*	94.0	72.5
St. Louis	75.0	99.0*	101.0	72.5
Aggregate	94.0	96.5	88.0	68.2

*Revised

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$41.17	$41.17	$44.17	$39.83
No. 2 bundles	$27.83	$27.50	$30.50	$29.00
Nonferrous				
Aluminum ingot	26.80	26.80	26.80	26.80
Copper, electrolytic	33.00	33.00	30-33	29.00
Lead, St. Louis	12.30	12.30	12.80	12.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	99.00	99.00	100.75	99.125
Zinc, E. St. Louis	12.50	12.50	12.50	11.50

Pump, Compressor Outputs Up

Manufacturers are looking ahead to 1960 as a year for increased production.

However, they fear another steel walkout. It could cripple the industry.

▪ Manufacturers of pumps and compressors are looking ahead to 1960 as a year of stepped up business at home and abroad.

They estimate next year should see a steady increase in both domestic and foreign sales and, in turn, increased profits. However, their greatest fear at present is a resumption of the steel strike.

Possible Disaster—The effects of the walkout have not been too serious thus far. However, if the workers go out again the results could be disastrous, manufacturers say. Because their business is mostly custom building, they suffered some shortages. But for the most part, they were able to fill orders in 1959.

Now, they say, the situation is changed and they won't be able to build up specialized inventories as do standard product users.

Another Fear — They are also keeping their eye on the railroad situation. They don't want any walkout here, either. Like the steel strike this could affect their industry greatly in materials supply and transporting finished goods.

This year wasn't particularly a banner one in helping recover from the recession. But sales and profits were up, and 1960 should show even further increases.

Better First Half—The first half of the year, however, should bring greater production activity than the second. This is a general consensus, but some manufacturers say the upward trend may continue through the year.

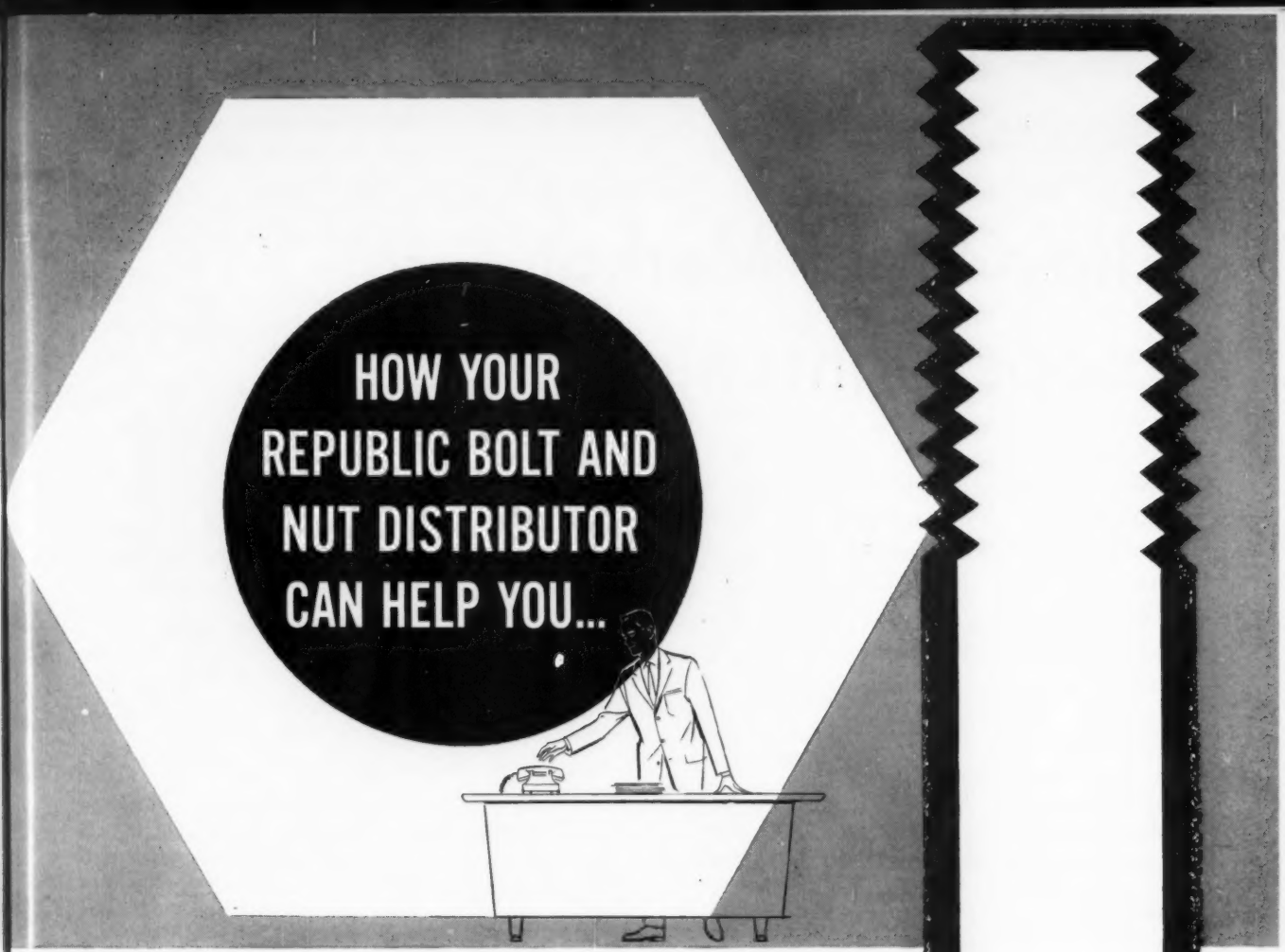
Backlogs at the end of 1959 are about the same as they were at the end of last year. There is a possibility they will be extended in the spring as business picks up.

New Designs — Many manufacturers will come out with new designs next year. Especially in the pump field, producers are aiming at new designs that will work under higher temperatures than now possible and that will be able to handle greater liquid and solid flow volumes.

Industrial pump production in 1960 is expected to hit about 568,000 units. This compares to 510,000 in 1959, and 485,000 in 1958. Exports will rise to about 83,000 units against 80,000 last year and 74,000 in 1958. Imports will pose no problems as less than a thousand units are expected to come into the U. S.

Compressor output will follow the same trend. Production for domestic consumption should reach 364,000 in 1960. In 1959 324,000 units were turned out, and 306,000 in 1958. Exports will see an increase of approximately 2000 units over the 75,000 units in 1958. Exports in 1958 reached 67,000 units. Imports will be on a par with pumps.

FIREFIGHTER: This new portable, gasoline operated pump is designed for fire fighting in inaccessible areas in a plant. It weighs 50 lbs and can be carried easily. It is manufactured by the Goodyear Pump Co., N. Y.



Keep informed on advanced fastening techniques

The art of industrial fastening is subject to constant change, and keeping abreast of it requires close contact with new developments in products and methods. Probably you yourself do not have the time nor the facilities to keep informed in every detail.

But any information you may need is always quickly available when you rely on the services of your local Republic Bolt and Nut Distributor. Keeping informed on the fastener industry is a vital aspect of his business. And his own know-how, combined with that of his staff, is backed up by the experts of Republic Steel—a company whose fastener background spans a century.

Your local distributor can quickly help you select the type of fastener best adapted to your special requirements. Then he can give you prompt delivery in any quantity—one bolt, a case, or truckload.

You'll be wise to become well acquainted with your local Republic Bolt and Nut Distributor, and with the complete range of services he offers you. Contact him soon.

Call your local distributor for quick deliveries of...

REPUBLIC Bolts and Nuts

REPUBLIC STEEL

Alloy Steel Market Keeps Tightening

There are still open spots on mill books for first quarter delivery, but the market is getting tighter.

Alloy plates will be in strong demand through the first half of 1960.

▪ The alloy steel market is tight, but not critical.

A great deal depends on the products wanted. Right now, auto plants are pushing hard for delivery of alloy bars. This has created a short-range jam-up on supplies.

Most mills feel, however, that this situation will ease. One mill official says some alloy bar schedules are still open for the first quarter.

Military Pressure—The outlook for heat-treated alloy plates is not so encouraging. Many mills are booked solid through the first half. Heavy defense orders for the Polarus-launching submarines and land missile bases have helped tighten the market. Because of these, some large commercial plate orders have been pushed aside.

Backups at heat treat facilities are also hampering mills. These producers are rushing building of new, enlarged heat treat lines. They want the capacity to help them protest newly developed commercial markets for alloy plate.

Sheet and Strip—Most mills are sold out through the first half on hot-rolled, cold-rolled, and galvanized sheet. Some specialty products—including electrical sheets and enameling sheets— are available for second quarter delivery.

Sheet customers are on a quota basis with the mills keeping a tight control over tonnage. Some buyers are thinking about third quarter bookings. But mills don't want to look that far ahead.

Heavy automotive demand is keeping the market for strip tight. This strong buying by the automakers should continue well into the first half.

Bars—Hot-rolled bars are not quite as critical as sheet products. But most mills are just about booked through the first six months of '60. Cold-finishers are sold out well into the second quarter. Some cold drawers are worried about their receipts of hot-rolled bar stock in the first quarter.

Plates and Shapes—Plate mills are comfortably booked through the first quarter, could be further out if they wished. Some buyers are lining up conversion plate tonnages for the second quarter. Both plate and structural mills expect renewed demand from railroad carbuilders.

PURCHASING AGENT'S CHECKLIST

Inventory buildup should spark record first half in 1960. P. 17

Aluminum prices are increased 1.3¢ a lb. P. 20

New study using motivation research shows hidden reasons why buyers buy. P. 24

Inventory buildup for firms using LIFO may be extended if Congress acts. P. 25

Wide flange beams should be tight well into the summer months.

Wire Products — Manufacturers wire is sold out through most of the first half. There are some holes in the second quarter. But late demand is filling out mill schedules rapidly. Merchant wire products are in easier supply.

Pipe and Tubing—Some standard pipe mills are sold out through February. Other tubular products are more critical. Mills say most products are booked solid for the first half. Makers of oil country seamless hope to build up stocks at downriver depots in the first half.

Galvanized Pipe Prices—Prices on galvanized pipe have been increased slightly by Republic Steel Corp., reflecting recent boosts in the price of zinc.

New Pipe Sold — Thin-walled electricweld pipe is now available from Republic Steel Corp. for low pressure gas gathering and distribution lines. According to the producer, the pipe will give these users lower net costs than if they purchased regular buttweld pipe.

Until now, customers wanting pipe in sizes under 2 in. and lighter than standard walls bought on a mechanical tubing basis. Republic feels that thinner walled pipe will find a ready market in many low pressure, low corrosion uses. It will be made to applicable parts of American Petroleum Institute specification 5L and pressure tested.

Service Centers—Warehouses are trying to rebuild stocks, but it's a slow, difficult process. **Midwest** outlets are having more trouble accumulating stocks than **East Coast** distributors.

November Steel Output — Steel mills produced 7,262,000 net tons of ingots and steel for castings last month, the American Iron and Steel Institute reports. This output was the highest for any month since last June. During November, steelmaking facilities operated at an average capacity of 59.8 pct. The average for October was 13.6 pct.

COMPARISON OF PRICES

(Effective Dec. 22, 1959)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Dec. 22 1959	Dec. 15 1959	Nov. 23 1959	Dec. 22 1958
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	13.55	13.55	13.55	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

	Dec. 22 1959	Dec. 15 1959	Nov. 23 1959	Dec. 22 1958
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	12.25	12.25	12.25	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$42.50*	$41.50	$45.50	$42.50
No. 1 steel, Phila. area	41.50	41.50	44.50	33.50
No. 1 steel, Chicago	39.50*	40.50	42.50	43.50
No. 1 bundles, Detroit	38.50*	40.50	44.50	35.50
Low phos., Youngstown	48.50*	49.00	51.50	44.50
No. 1 mach'y cast, Pittsburgh	55.50	55.50	55.50	50.50
No. 1 mach'y cast, Phila.	54.50	54.50	54.50	48.50
No. 1 mach'y cast, Chicago	60.50	60.50	63.50	53.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$47.17	$41.17**	$44.17	$39.83
No. 2 bundles	27.83*	27.50	30.50	29.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.75-15.50	$14.50-15.50	$14.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	30-33	29.00
Copper, Lake, Conn.	33.00	33.00	33.00	29.00
Tin, Straits, N. Y.	99.00†	99.00	100.75	99.125
Zinc, East St. Louis	12.50	12.50	12.50	11.50
Lead, St. Louis	12.30*	12.30	12.80	12.80
Aluminum, virgin ingot	26.80	26.80	26.80	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites
Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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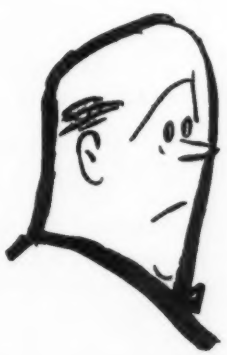

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Year-end Doldrums Hit Trading

The market shows few signs of activity as the end of the year approaches.

And orders for scrap are expected to remain small until there is a steel labor settlement.

▪ Market activity has all but ground to a halt as the Holidays approach. The optimism of a month ago has become near-apathy. For the most part, few brokers or dealers now expect steel mills to place tonnage orders for scrap until a steel labor settlement is reached.

Prices eased again this week in a number of areas. Selected grades dropped $1 on appraisal in Cleveland, Detroit and Youngstown as January auto lists showed a sharp jump in the tonnage of scrap offered.

Pittsburgh was a notable exception to the trend as openhearth grades moved up $1 on the basis of a new order for limited tonnages. It is still to early to tell if the higher prices are the start of an uptrend, or just a spot buy.

Correction: The No. 1 heavy melting Composite was incorrectly quoted on p. 217 of the Dec. 17, 1959 issue. The correct price should have been $41.17.

Pittsburgh—Prices of openhearth grades moved up $1 when a local mill came into the market for about 15,000 tons of scrap. A small tonnage of No. 2 bundles was bought by another mill at $31. It isn't clear whether the higher prices are part of a rising trend or are merely a temporary adjustment. Bad weather and low prices have reduced yard collections.

Chicago — The market continued easy, with minor purchases of No. 1 heavy melting at $1 under previous lists. Purchases by mills at the new price are confined to small tonnages, and most of the market has adopted a wait-and-see attitude. Foundry and cast grades continue strong.

Philadelphia — The market is coasting into the Holiday season with little activity expected until afer January 1. Export is expected to pick up then. One mill has offered to buy No. 2 grades at $2 under the current price, but there have been few, if any, takers as long as sales are possible at the higher price. The price of machine shop turnings was quoted incorrectly in the Dec. 17 issue. The correct price should have been $22 to $23.

New York — Heavy melting grades and No. 2 bundles are down in a dead market. The trade is baffled by the fact mills are buying very little scrap at present. But a sharp increase is expected once the labor picture is clarified.

Detroit — Tonnage offered on January industrial lists is very heavy. Prices are substantially below last month. Dealers are taking in more scrap than they're shipping. Mills still aren't in a buying mood. As greater amounts of scrap come out of currently booming auto plants, prices are expected to weaken further. An upturn isn't expected until a steel settlement is reached.

Cleveland — The market weakened $1 on appraisal based on current broker buying prices. Apparently the market will stay weak until some steel labor settlement is reached. Auto lists for January will be very heavy and with the chance of a new steelworker walkout, a price drop seems probable.

St. Louis — An easier undertone prevails. The Holiday season along with an uneasy feeling about a renewed steel strike has slowed activity here to a near standstill.

Cincinnati — The market has an undertone of weakness in sympathy with other areas. Area mills are expected to be in the market for scrap in January, but present shipments are on old orders. Some secondary bundles are moving upriver. Bids for some excess production scrap in the area were $6 under the first of the month.

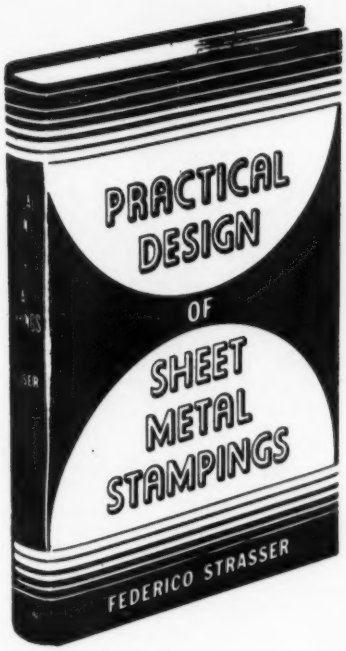
Birmingham — Scrap movement is almost at a complete standstill with nearly all buyers out of the market. They're apparently waiting to see what will happen in steel negotiations. Some out-of-district foundries are buying small quantities at reduced prices. The export market is quiet.

Buffalo—The only activity here has been a small sale of No. 1 cupola cast at quoted prices. Weakness continues to permeate the market. Little activity is expected before the first of the month, but some dealers say they'll resist lower prices. The price of No. 1 dealer bundles was incorrectly quoted last week. The correct price should have been $36 to $37.

Boston—The market has been in the doldrums for several weeks, and now with the Holiday season having set in, there's even less activity. A lot of prices are nominal, based on appraisal.

West Coast — Prices are soft in San Francisco and Los Angeles and the market remains dull. Some 50,000 tons of scrap will go to Japan in January.

Houston — There's little activity to disturb a quiet market. The export market has eased. Intake is slow and cast prices have weakened a little.



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SCRAP PRICES *(Effective Dec. 22, 1959)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	44.00 to 45.00
No. 1 factory bundles	50.00 to 51.00
No. 2 bundles	31.00 to 32.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	25.00 to 26.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	29.00 to 30.00
Low phos. punch'gs plate	52.00 to 53.00
Heavy turnings	37.00 to 38.00
No. 1 RR hvy. melting	49.00 to 50.00
Scrap rails, random lgth.	60.00 to 61.00
Rails 2 ft and under	66.00 to 67.00
RR specialties	57.00 to 58.00
No. 1 machinery cast.	55.00 to 56.00
Cupola cast.	51.00 to 52.00
Heavy breakable cast.	49.00 to 50.00
Stainless	
18-8 bundles and solids	235.00 to 240.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	130.00 to 135.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	40.00 to 41.00
No. 1 factory bundles	45.00 to 46.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	22.00 to 23.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Low phos. forge crops	54.00 to 55.00
Low phos. punch'gs plate, ¼ in. and heavier	51.00 to 52.00
Low phos. 2 ft. and under	49.00 to 50.00
No. 1 RR hvy. melting	45.00 to 46.00
Scrap rails, random lgth.	56.00 to 57.00
Rerolling rails	63.00 to 64.00
Rails 2 ft. and under	62.00 to 63.00
Angles and splice bars	54.00 to 55.00
RR steel car axles	59.00 to 60.00
RR couplers and knuckles	51.00 to 52.00
No. 1 machinery cast.	60.00 to 61.00
Cupola cast.	54.00 to 55.00
Cast iron wheels	48.00 to 49.00
Malleable	62.00 to 63.00
Stove plate	50.00 to 51.00
Steel car wheels	51.00 to 52.00
Stainless	
18-8 bundles and solids	220.00 to 225.00
18-8 turnings	120.00 to 125.00
430 bundles and solids	120.00 to 125.00
430 turnings	60.00 to 65.00

Philadelphia Area

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	45.00 to 46.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	45.00 to 46.00
Machine shop turn.	22.00 to 23.00
Mixed bor. short turn.	23.00 to 24.00
Cast iron borings	22.00 to 23.00
Shoveling turnings	26.00 to 27.00
Clean cast. chem. borings	28.00 to 29.00
Low phos. 5 ft and under	48.00 to 49.00
Low phos. 2 ft punch'gs	50.00 to 51.00
Elec. furnace bundles	48.00 to 49.00
Heavy turnings	34.00 to 35.00
RR specialties	50.00 to 51.00
Rails, 18 in. and under	67.00 to 68.00
Cupola cast.	44.00 to 45.00
Heavy breakable cast.	46.00 to 47.00
Cast iron car wheels	50.00 to 51.00
Malleable	67.00 to 68.00
No. 1 machinery cast.	54.00 to 55.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	20.00 to 21.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	20.00 to 21.00
Low phos. 18 in. and under	48.00 to 49.00
Rails, random length	54.00 to 55.00
Rails, 18 in. and under	62.00 to 63.00
No. 1 cupola cast.	49.00 to 50.00
Hvy. breakable cast.	44.00 to 45.00
Drop broken cast.	59.00 to 60.00

Youngstown

No. 1 hvy. melting	$45.50 to $46.50
No. 2 hvy. melting	38.00 to 39.00
No. 1 dealer bundles	45.50 to 46.50
No. 2 bundles	29.00 to 30.00
Machine shop turn.	20.50 to 21.50
Shoveling turnings	25.50 to 26.50
Low phos. plate	48.00 to 49.00

Cleveland

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	34.50 to 35.50
No. 1 dealer bundles	42.00 to 43.00
No. 1 factory bundles	44.50 to 45.50
No. 2 bundles	25.50 to 26.50
No. 1 busheling	42.00 to 43.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Cut structural & plates, 2 ft & under	48.50 to 49.50
Drop forge flashings	42.00 to 43.00
Low phos. punch'gs plate	43.00 to 44.00
Foundry steel, 2 ft & under	42.00 to 43.00
No. 1 RR hvy. melting	45.50 to 46.50
Rails 2 ft and under	65.00 to 66.00
Rails 18 in. and under	66.00 to 67.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	60.00 to 61.00
No. 1 machinery cast.	56.00 to 57.00
Stove plate	51.00 to 52.00
Malleable	67.00 to 68.00
Stainless	
18-8 bundles	215.00 to 225.00
18-8 turnings	100.00 to 110.00
430 bundles	115.00 to 120.00

Buffalo

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 busheling	36.00 to 37.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	20.00 to 21.00
Low phos. plate	44.00 to 45.00
Structurals and plate, 2 ft and under	44.00 to 45.00
Scrap rails, random lgth.	42.00 to 43.00
Rails 2 ft and under	52.00 to 53.00
No. 1 machinery cast.	53.00 to 54.00
No. 1 cupola cast.	49.00 to 50.00

St. Louis

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	43.00 to 44.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	19.50 to 20.50
Shoveling turnings	21.50 to 22.50
Cast iron borings	24.00 to 25.00
No. 1 RR hvy. melting	44.00 to 45.00
Rails, random lengths	52.00 to 53.00
Rails, 18 in. and under	57.00 to 58.00
Angles and splice bars	50.00 to 51.00
RR specialties	49.00 to 50.00
Cupola cast.	51.00 to 52.00
Heavy breakable cast.	45.00 to 46.00
Stove plate	43.50 to 44.50
Cast iron car wheels	48.50 to 49.50
Rerolling rails	62.00 to 63.00
Unstripped motor blocks	45.00 to 46.00

Birmingham

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	23.00 to 24.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles	40.00 to 41.00
Elec. furnace, 3 ft & under	38.00 to 39.00
Bar crops and plate	44.00 to 45.00
Structural and plate, 2 ft.	43.00 to 44.00
No. 1 RR hvy. melting	36.00 to 37.00
Scrap rails, random lgth.	52.00 to 53.00
Rails, 18 in. and under	56.00 to 57.00
Angles and splice bars	49.00 to 50.00
Rerolling rails	61.00 to 62.00
No. 1 cupola cast.	53.00 to 54.00
Stove plate	53.00 to 54.00
Cast iron car wheels	44.00 to 45.00
Unstripped motor blocks	42.00 to 43.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
No. 2 dealer bundles	19.00 to 20.00
Machine shop turnings	10.00 to 11.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	15.00 to 16.00
Clean cast. chem. borings	23.00 to 24.00
No. 1 machinery cast.	39.00 to 40.00
Mixed yard cast.	37.00 to 38.00
Heavy breakable cast.	37.00 to 38.00
Stainless	
18-8 prepared solids	200.00 to 205.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	20.00 to 21.00
No. 1 bushelings	36.00 to 37.00
Drop forge flashings	36.00 to 37.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	23.00 to 24.00
Heavy breakable cast.	41.00 to 42.00
Mixed cupola cast.	47.00 to 48.00
Automotive cast.	52.00 to 53.00
Stainless	
18-8 bundles and solids	205.00 to 210.00
18-8 turnings	80.00 to 85.00
430 bundles and solids	100.00 to 105.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	11.00 to 12.00
Shoveling turnings	14.00 to 15.00
Clean cast. chem. borings	16.50 to 17.50
No. 1 machinery cast.	41.00 to 42.00
Mixed cupola cast.	37.00 to 38.00
Heavy breakable cast.	35.00 to 36.00

San Francisco

No. 1 hvy. melting	....	$40.00
No. 2 hvy. melting	....	36.00
No. 1 dealer bundles	....	36.00
No. 2 bundles	....	22.00
Machine shop turn.	$17.00 to	19.00
Cast iron borings	17.00 to	19.00
No. 1 cupola cast.	....	47.00

Los Angeles

No. 1 hvy. melting	....	$41.00
No. 2 hvy. melting	....	39.00
No. 1 dealer bundles	....	38.00
No. 2 bundles	....	20.00
Machine shop turn.	$18.00 to	19.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	18.00 to	19.00
Elec. furn. 1 ft and under (foundry)	49.00 to	50.00
No. 1 cupola cast.	47.00 to	48.00

Seattle

No. 1 hvy. melting	....	$35.00
No. 2 hvy. melting	....	33.00
No. 2 bundles	....	22.00
No. 1 cupola cast.	....	36.00
Mixed yard cast.	....	36.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	....	$32.25
No. 2 hvy. melting	....	28.25
No. 1 dealer bundles	....	32.25
No. 2 bundles	....	24.00
Mixed steel scrap	....	24.25
Bush., new fact., prep'd	....	32.25
Bush., new fact., unprep'd	....	26.25
Machine shop turn.	....	14.00
Short steel turn.	....	17.00
Mixed bor. and turn.	....	13.00
Cast scrap	$46.50 to	48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	....	$34.00
No. 2 hvy. melting	....	31.00
No. 2 bundles	....	20.00
Machine shop turn.	....	16.00
Shoveling turnings	....	20.00
Cut structural plate 2 ft & under	$48.00 to	49.00
Unstripped motor blocks	37.50 to	38.50
Cupola cast.	46.00 to	47.00
Heavy breakable cast.	34.00 to	35.00

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IMPORT & EXPORT — LIVINGSTON & SOUTHARD, INC., CHRYSLER BUILDING EAST, NEW YORK, N. Y. • 5950 S. BOYLE AVE., LOS ANGELES 58, CAL. • *Cable Address:* FORENTRACO

Aluminum Signs Labor Pacts

Companies and the union disagree on the cost of the new aluminum contracts.

Either way, pacts are for three years with smallest wage hikes coming the first year.

▪ It is now obvious that new aluminum-labor contracts could have been signed almost anytime since last summer.

The only blocks were: Reticence of some to settle before the steel industry, and minor details.

Both were conquered last weekend. The five producers (Aluminum Co. of America, Reynolds Metals Co., Kaiser Aluminum & Chemical Co., Olin Mathieson Chemical Corp., and Ormet) signed new contracts with the United Steelworkers. Some also signed with Aluminum Workers International, the industry's second largest union.

Joint Announcement — In the end, details rather than long-standing tradition posed the only "problem". At least one of the Big three actually signed its contract Friday, but held back the news to make a joint announcement. Some of the companies took until Saturday to iron out the final details.

Spokesmen for the union and the companies say the new pacts vary slightly from plant-to-plant and company-to-company, mostly in fringe benefits. But both sides say they followed the lead of the canmakers, which signed with USWA last week.

Cost Opinions—The union estimates new contracts to be worth 30¢ over three years. Alcoa says its new pact will cost it 28.5¢ over three years, but says some producers will pay slightly more because of some fringe differences.

The companies got a break. By either company or union count, less than one-fourth of the total wage hike hits the first year. This takes some strain off, since the contracts are retroactive to August 1. The union puts wage hikes the first year at 5.5¢, Alcoa at 4.8¢.

Cost-of-Living—Starting August 1, 1960, wages go up an average 8¢ per hour, says the Union; 7.1¢ per hour, says Alcoa. The union pegs wage hike the third year at 8.5¢ per hour. Alcoa says it will be 8.9¢ per hour.

As with the canmakers, there's a cost-of-living kicker that could cost the companies another 3¢ in both the second and third years of the contracts.

The retroactive clause will cost Alcoa over $800,000 in back pay.

Aluminum

Aluminium Ltd., the Canadian producer which sells only primary metal in the U. S., is moving to up its penetration of this market.

Aluminium will acquire Apex Smelting Co., one of the largest secondary aluminum ingot makers in the U. S. The transaction has been approved by both boards of directors and should be completed in the first quarter 1960.

Aluminium will exchange 340,000 shares, at the rate of 1.6 to 1 for Apex stock.

Very little is being said by either company because there are still a few things to be done. But a source says Aluminium plans to make few, if any, corporate changes in Apex, In fact it will permit its property a large degree of autonomy.

Aluminium is emphasizing that this widens the range of alloys and service it can offer to foundries.

Copper

Kennecott Copper Co. and International Union of Mine, Mill and Smelter Workers hammered away at one another and finally came up with wage and fringe hikes that satisfied both. That was a week ago, but the union is still striking.

And sources on the scene say it will be another two weeks before a back to work move gains any steam.

The problem: Local issues. Kennecott has eleven Mine, Mill locals and each has a small set of noneconomic individual problems. Usually these are solved first. This time they weren't. Until each local, or union division is satisfied on local levels, it is withholding ratification.

Tin prices for the week: Dec. 16—99.00; Dec. 17—99.125; Dec. 18—99.125; Dec. 21—99.25; Dec. 22—99.25.*

* Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum Ingot	28.10	26.80	12/17/58
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	33.00	30.00	9/1/59
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium Ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	12.50	12.5-13	11/2/59
Zinc, N. Y.	13.00	13-13.5	11/2/59

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 85.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.032	.081	.136 .249	.250- 3.
1100, 3003	45.7	43.8	42.8	43.3
5052	53.1	48.4	46.9	46.0
6061-0	50.1	45.7	43.9	44.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6- 8	42.7-44.2	51.1-54.8
12-14	42.7-44.2	52.0-56.5
24-26	43.2-44.7	62.8-67.5
36-38	46.7-49.2	86.9-90.5

Screw Machine Stock—2011-T-3

Size*	¼	⅜-⅝	¾-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250- 2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Munts Metal	53.20	.....	48.26	.....
Comm. Bz.	56.17	56.46	55.86	59.48
Mang. Bz.	58.86	.....	52.21	.....
Phos. Bz. 5%	77.44	.....	78.19	.....

Free Cutting Brass Rod 36.06

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $7.25-$8.50; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$6.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $7.55-$9.50; Bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.40
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base.... $ 1.31
Cobalt, 97-99% (per lb).... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 33.30 to 42.00
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz.... $75 to $85
Lithium, 98% ..... $11.00 to $14.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $212 to $214
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz.. $22 to $24
Platinum, dollars per troy oz... $77 to $80
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 30.75
- No. 120 ..... 29.25
- No. 123 ..... 28.75

80-10-10 ingot
- No. 305 ..... 35.25
- No. 315 ..... 33.00

88-10-2 ingot
- No. 210 ..... 44.00
- No. 215 ..... 40.75
- No. 245 ..... 36.00

Yellow ingot
- No. 405 ..... 24.75

Manganese bronze
- No. 421 ..... 29.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 26.25-26.50
- 0.60 copper max. 26.00-26.25

Piston alloys (No. 132 type)..28.00-29.00
No. 12 alum. (No. 2 grade)...24.75-25.25
108 alloy 25.25-25.75
195 alloy 27.75-28.75
13 alloy (0.60 copper max.)...26.00-26.25
AXS-679 (1 pct zinc) 25.00-26.00

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 25.25-26.25
Grade 2—92-95% 24.00-25.00
Grade 3—90-92% 23.00-24.00
Grade 4—85-90% 22.50-23.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26¼	26
Mang. bronze	20¾	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 29½
- No. 2 copper wire 26
- Light copper 23¾
- *Refinery brass 24¼
- Copper bearing material 23¼

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 29½
- No. 2 copper wire 25½
- Light copper 23½
- No. 1 composition 23
- No. 1 comp. turnings 22¼
- Hvy. yellow brass solids 16¾
- Brass pipe 16¼
- Radiators 18

Aluminum

- Mixed old cast. ..... 14 —15
- Mixed new clips ..... 16½—17
- Mixed turnings, dry ..... 14½—15½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass
- No. 1 copper wire ..... 25½—26
- No. 2 copper wire ..... 22½—23
- Light copper ..... 21 —21½
- Auto radiators (unsweated). 14½—15
- No. 1 composition ..... 18½—19
- No. 1 composition turnings... 17 —17½
- Cocks and faucets ..... 15 —15½
- Clean heavy yellow brass ... 13 —13½
- Brass pipe ..... 15 —15½
- New soft brass clippings .... 15¼—15¾
- No. 1 brass rod turnings .... 12½—13

Aluminum
- Alum. pistons and struts .... 7½— 8
- Aluminum crankcase ..... 11¼—11¾
- 1100 (2s) aluminum clippings 15 —15½
- Old sheet and utensils ..... 11¼—11¾
- Borings and turnings ..... 7 — 7½
- Industrial castings ..... 11¼—11¾
- 2020 (24S) clippings ..... 12½—13

Zinc
- New zinc clippings ..... 6¾— 6¾
- Old zinc ..... 4¼— 4¾
- Zinc routings ..... 3 — 3¼
- Old die cast scrap ..... 2½— 2¾

Nickel and Monel
- Pure nickel clippings 52-54
- Clean nickel turnings 40
- Nickel anodes 52-54
- Nickel rod ends 52-54
- New Monel clippings 30-32
- Clean Monel turnings 20-23
- Old sheet Monel 26-28
- Nickel silver clippings, mixed 18
- Nickel silver turnings, mixed 16

Lead
- Soft scrap lead ..... 8¾— 9¼
- Battery plates (dry) ..... 4¼— 4½
- Batteries, acid free ..... 2½— 2¾

Miscellaneous
- Block tin ..... 77 —78
- No. 1 pewter ..... 59 —60
- Auto babbitt ..... 40 —41
- Mixed common babbitt ..... 9¾—10¼
- Solder joints ..... 14 —14½
- Siphon tops 42
- Small foundry type ..... 10¼—10¾
- Monotype ..... 10¼—10¾
- Lino. and stereotype ..... 9¼— 9¾
- Electrotype ..... 7¾— 8¼
- Hand picked type shells .... 6 — 6½
- Lino. and stereo. dross ..... 2¾— 3¼
- Electro dross ..... 2¾— 3¼

(Effective Dec. 21, 1959)

CF&I WIRE HELPS

PACKAGED for YOUR PRODUCTION

"CF&I Stem-paks cut machine loading time 80%... give us an extra hour of production every day," stated Mr. Frederick Voos, Plant Superintendent, Risdon Manufacturing Co., Waterbury, Conn.

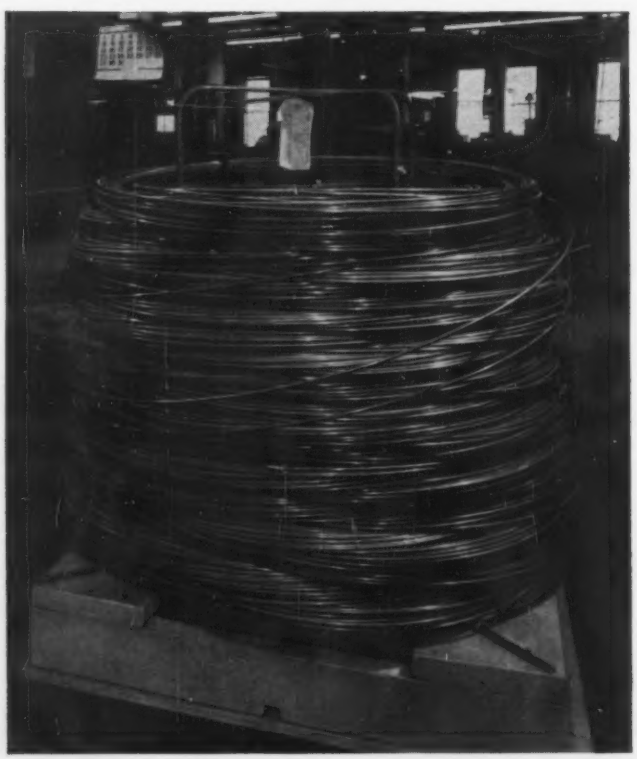
PROBLEM

1. "Our specially designed machines *were* fed wire from coils averaging 150 lbs. Because of the small size, frequent machine loadings were necessary. Each time, the coils had to be loaded by hand and the bindings clipped, after which the wire was guided through the straighteners before entering the machine. We were losing valuable production time due to excessive machine downtime," explained Mr. Voos.

SOLUTION

1. "Our Purchasing Department called a CF&I salesman who carefully examined our operation and recommended that we switch to CF&I Stem-paks which hold up to 1,000 lbs. of one continuous length of wire. Each Stem-pak feeds a machine for an average of one to two days... a production time equal to using seven coils with set-ups in the past.

"Stem-paks give us approximately an extra hour of production per day on each machine," Mr. Voos pointed out. "A Stem-pak can be set up in one-fifth of the time required for the seven coils of wire formerly used... *a saving of 80% on loading time.* The extra hour of production represents a 12½% increase in the operator's production time."



CF&I Stem-paks are delivered on pallets for fast unloading and easy in-plant handling by fork trucks.

PROBLEM

2. "Part of our operation required the use of wire that was free from rust, grease or dirt. Too often, unprotected coils would collect dirt in transit or storage.

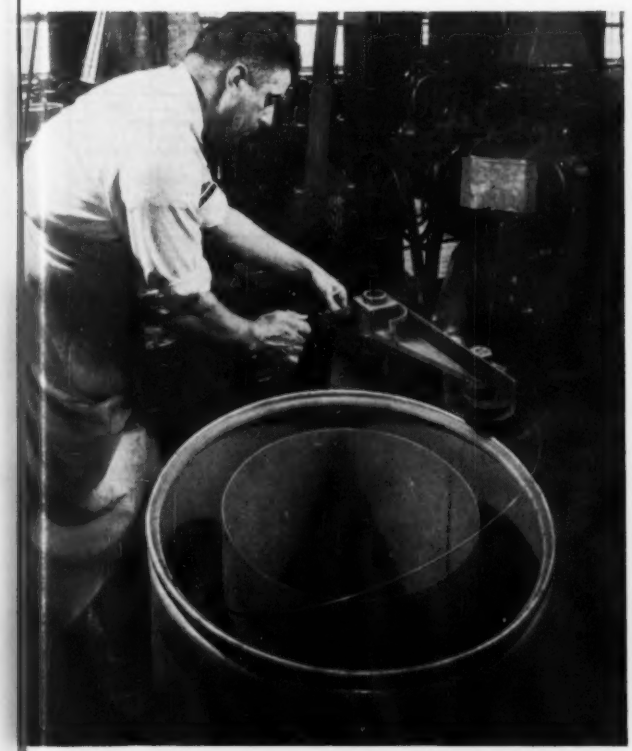
SOLUTION

2. "CF&I Fibre Drums are an ideal answer to the problem of unclean wire. The sturdy Fibre Drum has a metal cover and locking band which seals the drum, protecting the wire from grime and from corrosive elements. In addition, Fibre Drums hold up to 600 lbs. of one continuous length of wire which enables us to run our machines for a longer time than when we used small coils."

Stem-paks and Fibre Drums are just two of nine wire packages that CF&I offers to help make your operation more efficient and economical. When you order from

INCREASE PRODUCTION 12½%

at Risdon Manufacturing Co., Waterbury, Conn.



Risdon Mfg. Co. also uses CF&I Fibre Drums, which hold up to 600 lbs. of wire, for special operations. The sealed Fibre Drums protect the wire against rust and contamination during transit and in-plant storage. Note how closely the Fibre Drums can be placed to the machine and how evenly the wire pays off.

A Stem-pak is easily placed in storage alongside Fibre Drums. No messy storage problems... no chance of coils becoming tangled. Inventory of this neat, compact storage set-up is a quick, simple counting job.

CF&I, you can specify wire *packaged for your production* to give you one or more of these benefits:

- **less downtime through extra-long continuous lengths of wire**
- **compact storage and simplified inventory control**
- **fast unloading and in-plant handling**
- **assured cleanliness of the wire**
- **smooth pay off of the wire**

A CF&I salesman will be glad to assist in selecting the *right* wire package for your operation. There's no charge for this service, so call our nearest sales office today.

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

CF&I STEEL

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Farmington (N. M.) Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco San Leandro • Seattle • Spokane • Wichita

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IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3, R3*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W3*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective Dec. 21, 1959)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*			7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets.

(Effective Dec. 21, 1959)

*7.425 at Sharon-Niles is 7.225

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.675 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,J3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, S12*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Dec. 21, 1959) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Chicago, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50								
Youngstown *R3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50								
Fontana *K1*	+10.75	+26.00	+7.75	+22.00	+4.25	+17.50	+1.75	+16.75	+1.25	+15.75	+0.75	+15.25	0.75	+15.50								
Pittsburgh *J3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Alton, Ill. *L1*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50								
Sharon *M3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50								
Fairless *N2*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50								
Pittsburgh *N1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Wheeling *W5*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50								
Wheatland *W4*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50								
Youngstown *Y1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Indiana Harbor *Y1*	1.25	+14.0	4.25	+10.0	7.75	+5.50	10.25	+4.75	10.75	+3.75	11.25	+3.25	12.75	+3.50								
Lorain *N2*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50								
Youngstown *R3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50								
Fontana *K1*	+6.25		+2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Alton, Ill. *L1*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50								
Sharon *M3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Wheeling *W5*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Indiana Harbor *Y1*	5.75	+8.0	9.75	+4.0	12.75	0.50	13.25	+0.75	13.75	0.25	14.25	0.75	14.75	+0.50								
Lorain *N2*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 12.50¢ per lb.

(Effective Dec. 21, 1959)

TOOL STEEL

F.o.b. mills

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	2	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate (*L4, C4, A3, J2*) 15 pct	Plate (*L4, C4, A3, J2*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 44.20; 1 side, 36.80.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Ironton, O., f.o.b.	30.50
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	175	192	...	214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	9.10	9.775
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*****	173	190	177	212	196	9.00	9.70
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.775
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	...	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4***	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2*****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	187	217	198†	9.25	9.80†
Monessen *P6*	.....	.....	.....	.....	193	8.65	9.325
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.60	10.15
Rankin, Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	...	236	.....	9.95	10.50†
SparrowsPt. *B3***	175	.....	...	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 11-12¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Chicago	.....	.....	.....	15.60	.....
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

(Effective Dec. 21, 1959)

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.50
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Electrolytic, domestic	48.25
Precipitated	40.50 to 45.00
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	43.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine				
½" and smaller x 3" and shorter	55	57	61	62
⅝" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
¾" thru 1" diam. longer than 6" and 1½" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

C. P. Hex, reg. & hvy.

¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

Hot Galv. Hex Nuts (All Types)

¾ in. and smaller	41

Semi-finished Hex Nuts

¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

(Add 25 pct for broken case or keg quantities)

Finished

⅞ in. and smaller	65

Rivets

Base per 100 lb

½ in. and larger	$12.85

Pct. Off List

7/16 in. and smaller	15

Cap Screws

Discount (Packages)

Full Finished H. C. Heat Treat

New std. hex head, packaged	Full Case
⅝" diam. and smaller x 6" and shorter	54 / 42
¾", ⅞", and 1" diam. x 6" and shorter	38 / 23
⅝" diam. and smaller x longer than 6"	.. / ..
¾", ⅞", and 1" diam. x longer than 6"	.. / ..

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	59	48
¾" through 1" dia. x 6" and shorter	45	32

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

	Quantity	Discount Mach. Screws	Stove Bolts
Plain Finish Cartons		60	60
Bulk			
To ¼" diam. incl.	25,000-and over	60	..
5/16 to ½" diam. incl.	15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Quantity	Discount Hex	Square
In Cartons		16	19
In Bulk			
⅜" diam. & smaller	25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	46.00
Electrodeposited	38.50
Brass, 80-20, ball anodes, 2000 lb or more	51.50
Zinc, ball anodes, 2000 lb lots	18.75
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.30
Tin, ball anodes $1.05 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	22.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	24.70
(Philadelphia price 25.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24	.....	.....	.....	.....
Baltimore**	.10	9.90	10.10	10.16	11.55	10.00	10.65	10.15	11.90	17.48	16.48	21.58	20.83
Birmingham**		9.43	10.20	10.46	10.91	9.79	10.00	9.59	13.14	16.76	.....	.....	.....
Boston**	.10	10.52	11.27	11.87	12.17	10.42	10.72	10.34	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.80	10.50	11.40	11.30	10.25	10.40	9.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.69	10.35	11.10	10.35	8.62	9.16	8.79	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	8.86	10.41	11.10	10.67	9.00	9.84	9.11	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.69[1]	9.89	11.09	10.47	8.88	9.67	8.90	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	8.95	10.61	11.40	10.72	8.99	9.84	9.10	11.16	17.38	16.38	21.48	21.03
Houston**		9.65	9.65	.....	10.85	9.65	9.35	8.90	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	9.02	10.27	11.37	9.33	9.71	9.82	9.81	10.22	16.87	15.87	20.37	19.62
Los Angeles**		9.95[1]	11.55	12.20	11.55	10.00	10.00	9.10	14.20	18.30	16.45	21.30	20.80
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11	.....	.....	.....	.....
Milwaukee**	.15	8.83	10.49	11.24	10.49	8.76	9.30	8.93	11.04	17.24	15.34	21.24	19.09
New York	.10	9.27	10.59	11.45	9.74	9.87	9.84	10.09	13.35	16.16	15.60	20.10	19.35
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	8.30	9.35	10.99	9.35	9.25	9.20	9.50	12.05	16.58	15.58	20.08	19.33
Pittsburgh**	.15	8.69	9.84	10.91	10.45	8.62	9.78	8.79	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	11.00	11.95[2]	11.50	12.25	11.00	10.95	10.75	15.20	18.30	16.35	22.90	20.60
Seattle**		11.55	12.30	12.50	12.65	11.00	10.20	11.10	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	11.70	12.45	12.65	13.30	11.15	11.35	11.75	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	9.07	10.73	11.48	10.73	9.00	9.76	9.17	11.43	17.48	16.48	21.58	19.33
St. Paul**	.15	8.95	9.46	10.62	10.47	8.75	9.48	8.85	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—¼" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—¾-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 10¢ zinc. ‡ Deduct for country delivery. [1] 13 ga. & heavier; [2] 14 ga. & lighter.

(Effective Dec. 21, 1959)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4* (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $103.50; (15.51-16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25 31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7,* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

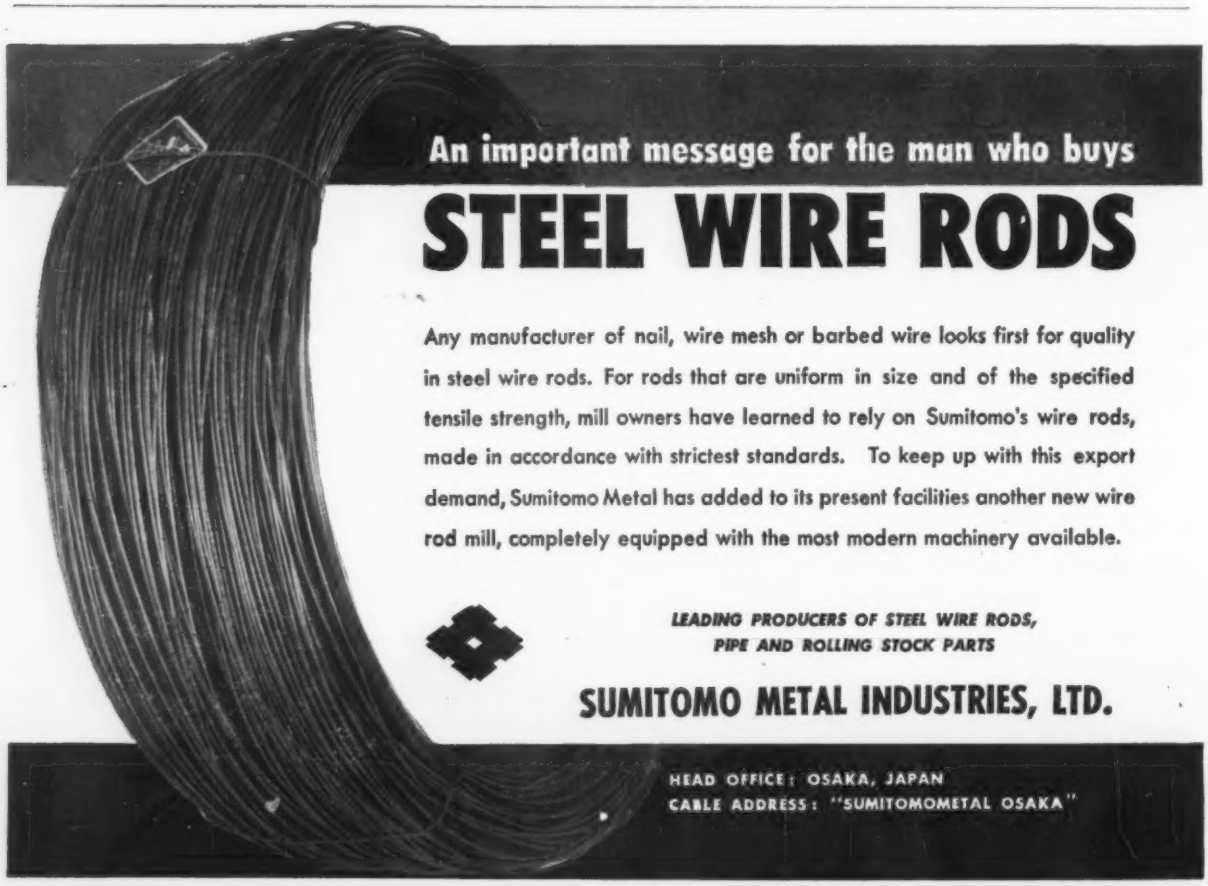
Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

(Effective Dec. 21, 1959)



An important message for the man who buys

STEEL WIRE RODS

Any manufacturer of nail, wire mesh or barbed wire looks first for quality in steel wire rods. For rods that are uniform in size and of the specified tensile strength, mill owners have learned to rely on Sumitomo's wire rods, made in accordance with strictest standards. To keep up with this export demand, Sumitomo Metal has added to its present facilities another new wire rod mill, completely equipped with the most modern machinery available.

LEADING PRODUCERS OF STEEL WIRE RODS, PIPE AND ROLLING STOCK PARTS

SUMITOMO METAL INDUSTRIES, LTD.

HEAD OFFICE: OSAKA, JAPAN
CABLE ADDRESS: "SUMITOMOMETAL OSAKA"

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 37.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 36.75
5-7% C, 61-65% Cr, 5-8% Si 22.00
5% max C, 50-55% Cr, 2% max Si.. 25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (¼" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Ca, 60-65% Si, 3.00 max. Fe.

Carloads, bulk 24.00
Ton lots 27.95
Less ton lots 29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk 23.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.25
Johnstown, Pa.	12.25
Neville Island, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk 14.80
Ton lots packed in bags 17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads 34.00
Ton lots 36.00
250 to 1999 lb 38.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk 12.80
Ton lots, packed 14.45
Carloads, bulk, delivered, per lb of briquet 15.10
Briquets, packed pallets, 2000 lb up to carloads 17.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	24.95	22.00
98% Si, 1.0% Fe	24.45	21.50

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

(Effective Dec. 21, 1959)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk .. .. 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound

Ton lots $3.45
Less ton lots..... 3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up
10 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over
No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
Ton lots (packed) $1.46
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

Experience Speaks

"I don't believe that you can build any kind of successful

"I'm not sure there is such a thing as waste circulation when you use leading trade publications."

Q What is the background of Surface Combustion Corporation?

A The business was started back in 1906 as one of the Dougherty enterprises. Originally we manufactured gas burners. Today Surface is a highly diversified organization primarily engaged in the engineering, development and manufacture of industrial heating and air-conditioning equipment and systems.

Q Is Surface Combustion the leader within the industry?

A As a manufacturer of industrial heating equipment we are in a leading position.

Q Tell me, Mr. Bluethe, how long have trade magazines been used to support your sales efforts?

A Here's a photocopy of our very first advertisement. It appeared back in 1925 and, as a matter of special interest to you, it appeared in The Iron Age.

Q Has your organization been a consistent advertiser ever since?

A Yes, even during the war years.

Q What do you consider the principal objectives of your advertising campaigns in the trade press?

A Well, you must bear in mind that we are not dealing in over-the-counter items. We manufacture heavy equipment—furnaces costing thousands of dollars even for the smallest and most modest type. There's a lot of engineering and sales work required before such equipment is sold. For this reason we have but one objective for our space advertising—to keep the name of our company and our products constantly before the eyes of our customers and prospects —to create prestige and acceptance for our products and to occasionally announce a new product.

Q What copy theme or technique do you find most effective?

A For our particular purpose, we find that case histories fill the bill. We are, of course, in a fortunate position—we are responsible for many of the really big and impressive installations throughout the country and therefore do not find it at all difficult to get good application stories.

Q Does this same theme extend to other phases of your advertising?

A The application story provides the basis for our entire merchandising program—for catalogs, folders, etc., and for trade paper advertisements.

Q What is your policy with regard to space? Do you believe in using large units?

A We use single pages and spreads. However, we plan our program so as to use as many spreads as possible—with color throughout.

Q Is this because of the extra attention value or is the space necessary to tell your complete story?

A Actually it's both. We have a rather lengthy story to tell if it's to be told at all. But with adequate space you can always tell a much better story and do more justice to your artwork. To my mind, these are important considerations in the fight for attention and readership.

Q What do you have to say about the value of the trade press to American business?

A I think it plays a more important part than any comparable force in any part of the business world. It has tremendous power of persuasion and tremendous acceptance. The American trade press is in no small way responsible for the mass markets on which the economy is built.

Q What audience do you reach through trade paper advertising?

A We talk to the production engineers—the heat-treating specialists. Actually, they have all kinds of titles. Some are called the chief engineer, others the vice president in charge of engineering. Some are the owners of commercial heating shops. In all cases they are high-level engineering personnel. But I have found that this is not our audience exclusively. We must talk to the equipment operators as well. Very often they have tremendous influence when it comes to the selection of capital goods. The impression that they have about an organization and its products can very well spell the difference between success and non-success.

advertising program without using trade magazines"

"The American trade press is in no small way responsible for the mass markets on which the economy is built."

Q You try to prepare advertisements of interest to all levels?

A Yes. So far as is possible we prepare our copy to appeal to all levels within an organization.

Q Do you agree that trade magazine advertising is both effective and economical?

A There's no doubt about it—that's our Number One reason for using them. Trade magazines offer the least costly way to reach the most people, most efficiently and most consistently.

Q You feel that such advertising is economical despite your rather limited market?

A Oh yes. In fact I'm not sure there is such a thing as waste circulation when you use leading trade publications. Let me explain. There are only about 6200 companies who are customers or potential customers for heat-treating equipment, no more. But we know full well that we must reach more than one person in each company. With changing responsibilities and the normal turnover in personnel, we must constantly reach many, many times more people with buying influence than are at present employed by the 6200 companies. Therefore, in a broad sense, we are talking to everyone who reads the publications we use. If a man is interested in and reads any of the publications which carry our advertising, he has potential influence on our success.

"If a man is interested in and reads any of the publications which carry our advertising, he has potential influence on our success."

Q In coordinating your advertising with the sales effort, do you work directly with the sales manager of each department?

A We have, I believe, an ideal relationship with our sales people. We in advertising operate just as though we were an advertising agency—and each division a valued client. We act the part of account executives and maintain constant contact with the division managers. We work with them and their sales personnel to develop the type of advertising support best suited to the particular needs of the department.

Q In conclusion, Mr. Bluethe, I'd like to ask just how important you consider trade publications to the success of your own sales program.

A We couldn't do without them. I don't believe you can build any kind of successful advertising program without using trade magazines. They are the backbone of any well-conceived and successful sales effort.

Trade and industrial magazines are the all-important link between you and the buying influences you want to reach. They provide the means for reaching your immediate customers and prospects on common ground—at a time when they are most receptive to your sales messages. In this respect, they fill a role unduplicated by any other known selling force.

Chilton, one of the most diversified publishers of trade and industrial publications in the country, has the resources and experience needed to make each of 16 magazines outstanding in its field. Each covers its particular field with an editorial excellence and strict control of circulation that assure confidence on the part of both readers and advertisers. With such acceptance goes proportionate selling power.

Chilton

COMPANY

Chestnut and 56th Streets • Philadelphia 39, Pennsylvania

Publisher of: Department Store Economist • The Iron Age • Hardware Age • The Spectator • Automotive Industries • Boot and Shoe Recorder Commercial Car Journal • Butane-Propane News • Electronic Industries • Jewelers' Circular–Keystone • Motor Age • Gas • Optical Journal & Review of Optometry • Hardware World • Distribution Age • Aircraft and Missiles Manufacturing • Business, Technical and Educational Books

ELECTRICAL POWER
EQUIPMENT IN STOCK

DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	3900	New Elliott	Enc. F.V.	475	320
1	3000	New Whse.	Enc. F.V.	525	600
2	2700	G.E.	MCF	415	280
1	2250	New Elliott	Enc. F.V.	600	200/300
1	2200	G.E.	MCF	600	400/500
2	2000	G.E.	MCF	350	230/350
2	1750	G.E.	MCF	250	175/350
4	1500	New Whse.	Enc. F.V.	525	600
2	1400	G.E.	MCF	250	165/300
1	1300	G.E.	MCF-12	300	200/400
1	1200	G.E.	MCF	600	450/600
1	1000	Whse.		500	800/2000
4	1000	GM.	D8	600	600/900
2	940	S.S.	Enc. F.V.	600	800/1000
2	800	G.E.	MCF	250	400/750
2	765	Allis Ch.	MHC	550	1012/1350
2	750	G.E.	MCF	600	450/900
1	750	G.E.	M.F.	600	120/360
4	600	Whse.		250	275/550
1	500	G.E.	MPC-10	250	188/400
2	450	Whse.		550	415
4	400	GM.	D8	250	300/900
2	400	G.E.	CY-275	300	1000/1500
2	225	Allis Ch.	MHC	250	450/900
1	300	Cr. Wh.	H-102 B.B.	230	1200
1	200	Rel. B.B.	T-664-D.P.	240	850
1	150	Cr. Wh.	CMC-65H	230	1150
1	150	G.E.B.B.	TLC-74	250	1150/3500
1	150	G.E.B.B.	CD	600	250/750
1	150	G.E.B.B.	CDP-125	230	1750
1	120	G.E.B.B.	TLC-50	250	1950/5000
1	100	Whse.	SK-180	230	450/1100
1	100	G.E.	CDP-145	230	1750
1	80	Whse.	SK-123.9	240	2000/4500
1	75	G.E.B.B.	CD-1235-D.P.	600	850
1	60/75	Rel.	1050T	250	350/1050
1	30/40	Whse. B.B.	SK-131, TEFC	250	500/1500

MERCURY ARC RECTIFIERS

3—150 KW, G.E., Sealed Tube Ignitron Unit Substation load centers 275 V. D.C., 2300 V. A.C. Pyranol filled transformers complete.

2—150 KW, G.E., Ignitron, 245 V. D.C.—230 V. A.C. air cooler transformers with controls.

MG SETS—3 Ph. 60 CY.

Qu.	K.W.	Make	RPM	DC Volts	AC Volts
1	2000	G.E.	514	600	2300/4600
2	1750/2100	G.E.	514	250/300	2300/4600
1	1700	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1500	Cr.Wh. 4 unit	720	100	2300
1	500	G.G.	900	125/250	440
1	500	G.G.	900	250	2300/4600
1	500	G.E.	1200	300	2300
1	350	G.E.	900	125	440/2300/4160
1	300	G.E.	1200	250	2300/4000
1	300	G.E.	1200	250	440/2300
1	250	G.E.	900	250	440/2300
1	240	Whse.	900	125	220/440
1	200	Whse.	1200	550	2200
1	200	El. Mhy.	1200	250	2300/4600
1	150	G.E.	1200	275	2300
1	150	Whse.	1200	275	2300
1	150	G.E.	1200	250	440
1	150	G.E.	1200	125	440
	140	Cr.Wh.	900	125/250	2300
1	100	G.E.	1170	250	220/440
2	100	Cr.Wh.	81160	525	220/550
1	100	G.E.	1200	250	2400/4100
2	75	Whse.	1200	125	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
3	3333	Whse.	OISC	1	13800 x 2300
3	1000	G.E.	CA/FA	1	13800 x 230/460
3	833	A.C.	OISC	1	4800/2400 x 480
3	833	A.C.	OISC	1	10175/13475x 2300/4000
2	750	G.E.	Pyranol	1	4800x85/55-255/165
3	500	Mal.	C	1	6600/11430J x 480
3	500	Kuhl	OISC	1	13200 x 6600
3	150	G.E.	OISC	1	33000x2300/4000Y
3	100	G.E.	HS	1	4800/8320Y x 120/240

CRANE & MILL MOTORS

230 V. D. C.

Qu.	H.P.	Make	RPM	Type
12	12/14	Whse.	700/600	MCA-30, Series
1	20	Whse.	975	K-5 Series
2	22	G.E.	650	MD8-406
1	35	Whse.	480	CK-9 Comp. S.B.
1	35	Whse.	480	CK-9 Sh. R.B.
1	45	Whse.	600	CK-9 Comp. S.B.
2	50	G.E.	650	COM-1830 Comp.
2	50	Whse.	525	CK-9 Shunt R.B.
2	50	Whse.	600	CK-9 Comp. R.B.
1	50	G.E.	525	COM-1830AEB.B.
1	50	Cr.Wh.	550	BW-50 Comp.
1	100	G.E.	475	CO-1832 S.B.
6	100-140	Whse.	500/415	MC-90 R.B.

RE-NU-BILT By

BELYEA COMPANY, INC.

47 Howell St. Jersey City 6, N. J.

Tel. OLdfield 3-3334

Used Machine Sales Still Slow in N.Y.

Fourth quarter sales have been disappointing to dealers in the New York area.

They are looking forward to 1960 for a general pickup and hope the trend will last.

■ Hope of an improvement in the new year is the stirring feature of the used and rebuilt machinery business in the New York area. With a few exceptions, the fourth quarter has been very disappointing, with both sales and inquiries down considerably.

None of 1959 has been outstanding, but fourth quarter for most dealers has been particularly slow. While it is hard to pinpoint precise cause-and-effect examples, there is wide consensus that the steel strike has been a major damper on sales this year. First, customers were putting cash into steel inventories rather than machinery as a strike hedge. Later, and currently, steel shortages or the threat of them has made buyers leery of tying up money in equipment when there may not be anything to work on it.

Traditionally Slow — Also, the final period traditionally brings a year-end business drop-off. Budgets are running out of money, and cash is held for taxes. But several dealers report recent rises in inquiries as customers build new budgets for 1960. One dealer has firm promises from two customers for later this winter. In each case the precise time of signing is unknown. One buyer is waiting on new steel supplies while the other is counting on a capital expansion program next year.

Over all, the omens are favorable for winter and spring sales. Capital spending plans are known to be high; construction, always a major market in this area, should be strong, with strikebound carryovers important. General metalworking continues at a good clip.

Buyers Fussy — Construction equipment is now a relatively bright spot. Press brakes move almost as soon as they come on the market. Demand for shears remains good. Roll business is healthy. Cranes remain a scarcity item. As capital expansion spending gains momentum, cranes will probably be among the most sought-after items.

Customers are fussy, however. They usually have a specific job in mind when they go shopping and nothing less than the just-right tool will do. Lightweights are hard to move. Demand is for medium and heavy duty equipment for most cases. This is particularly true for presses and sheet metal tools. Buyers of these have been upgrading capacity requirements for some time.

New Items Wanted — Similarly, machinery must be late model. Technical advances by tool builders in recent years have proven too valuable to forego. Older tools are almost impossible to sell domestically, and the export market is becoming more limited.

Electrical equipment continues to jog along. One dealer sums it up: "I suppose I can't honestly complain, but I can and do wish things were a lot better."

CONSIDER GOOD USED EQUIPMENT FIRST

BENDER
Wallace 500—5⅝ Bender, with Hydr. Mandrel Extracter Unit—NEW
BENDING ROLLS
10' x 10 Ga. Bertsch Initial Type
13' x 3/16" Bertsch Initial Type—New 1957
29' x ¼" Niles Pyramid Type
32' x ⅜" Baldwin Pyramid Type—New 1942
BRAKES—PRESS TYPE
90 ton Niagara, Model 90-8-10
500 ton Cincinnati, Capacity 12' x ⅝"
500 ton Pacific Hydraulic 14' x ½"
CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H	56' 8" Span	220/3/60 A.C.
10 ton P&H	55' Span	230/3/60
10 ton P&H	39' Span	230 Volt D.C.
10 ton Shaw	120' Span	230 Volt D.C.
15 ton Shepard Niles	36'6" Span	220/3/60 A.C.
15 ton Shepard Niles	37'9" Span	220/3/60 A.C.
15 ton Milwaukee	56' Span	440/3/60 A.C.
15 ton Shepard Niles	55'6" Span	220/3/60
30 ton Shaw	70' Span	230 Volt D.C.
40 ton P&H	75' Span	440/3/60 A.C.
120 ton Niles	67' Span	230 Volt D.C.
120 ton Shepard Niles	77' Span	220/3/60 A.C.

DRAW BENCHES
7,000 lb. Draw Bench, 51 ft. Draw
10,000 lb. Draw Bench, 50 ft. Draw
30,000 lb. Draw Bench, 41 ft. Draw
35,000 lb. Draw Bench, 41 ft. Draw
FLANGING MACHINE
⅜" Blue Valley No. 4
FORGING MACHINES
1" to 5" Acme, Ajax, National
HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING to 22,000 lbs.
LATHES—ENGINE
24" x 23' Monarch
60" x 40' Heavy Duty—LATE
LEVELERS—ROLLERS
24 Torrington 9 Rolls 8 Dia.
60" Guide 17 Rolls 4½ Dia.
72" Niles 7 Rolls 9" Dia.
NIBBLER
Pullmax Model 2, Capacity 11/32"
PRESSES—HYDRAULIC
300 ton Southwark Platen 28" x 28", Stroke 25"
400 ton Baldwin Southwark Horiz. Automatic Reversing Hydr. Press, 24" Stroke, 38½" Bet. Columns
500 ton Watson Stillman Piercing Press, 48" x 72"
500 ton HPM, 14" Stroke, 28" x 38" Bed
1000 ton Southwark Bed 44" x 54", Stroke 20"
Model F-1200-42 Clearing, 30" Stroke, 42x42" Bed
4500 ton B-L-H Bed 68" x 68", Stroke 40"
PUNCH & SHEAR COMBINATION
#2½ Buffalo Ironworker
Coper & Notcher, Punch 1"x⅞", Shear, 2½"Rd.2"Sq.
Style EF Cleveland Single End. 42" Throat
ROLLS—FORMING
8 Stand. Tishken 7¾" C to C of rolls Spindle 2½" Dia.
7 Stand. Yoder, 38" Roll Space, 3" Dia. Spindle.
14 Stand. Tishken, 34" Roll Space, 2½" Dia. Spindle
ROLL FORMING MACHINE TOOLING
Metal Floor & Roof Deck Forming Rolls—NEW. For any standard machine with 3" or 3½" spindle
ROLLING MILLS
Threadwell Ring Rolling Mill for 7" wide strip
10" x 10" Single Stand Two High
16" x 14" Single Stand Two High
13" x 16" Single Stand Two High
16" x 24" Two stand Two High
26" x 60" Single Stand Two High
17" x 26" Single Stand Two High—Modernized
20" x 28" Single Stand Two High
12" x 32" Birdsboro, 3-Hi Bar Mill
22" x 40" Lewis 3-Hi Sheet Mill
ROLLS—PLATE STRAIGHTENING
72" McKay 9 Rolls 15" Dia. Backed-up
90" McKay 9 Rolls 15" Dia. Backed-up
SCRAP CHOPPER
#2 Yoder, 4" Lawn Mower Rotary Type Scrap Chopper
SHEAR—BILLET
#500 Hill Acme, Air Clutch, Capy. 3½" Dia.
SHEARS—GATE
8' x 1" Wood Hydraulic
8' x ⅝ Beatty No. 29
SHEARS, MISC.
72" x ½" Cut-Off Line
60" x 10 Ga. Cut-Off Line
84"x3/16" United Up-Cut, 50 H.P. A.C. Motor Drive
SHEARS—ROTARY
No. 23A Quickwork Whiting 3/16 Capacity
No. 40A Quickwork Whiting ½" Capacity
SHEARS—SQUARING
6' x 14 Ga. Edward, Motor Drive—LATE
10' x ¾" Cincinnati
10' x ⅜" Niagara No. 910
SLITTERS
36" Waterbury Farrel, Slitting Line, Arbor 4½" Dia.
STRAIGHTENER
Torrington #1734 12 Roll. Cap. 1¾" Rd., 1-9/16" Sq., etc.
SWAGING MACHINE
#6½A Fenn 2-Die Capacity 3¾" Tube, 1¼" Solid
10" Die Length, Hydraulic Feed
TESTING MACHINES
60,000# B-T-E Universal Hydr. With Range Changer Stress Strain Recorder, Deflectometer, etc.
50,000, 100,000, 200,000# Univ. Beam Type
TUBE REDUCER
1¼" Standard
TUBE OR PIPE MILLS
Yoder Induction Weld Pipe Mill, 2" to 8"—LATE
McKay Electric Weld Tube Mill, ½" to 1¼"—LATE
WELDING POSITIONER
16,000# Ransom, Power Tilting & Rotation

Manufacturing • **A. T. HENRY & COMPANY, INC.** • Equipment

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Telephone COrtlandt 7-3437

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RAILWAY EQUIPMENT
FOR SALE
Used "As Is" and Reconditioned

RAILWAY CARS
All Types

SERVICE-TESTED
FREIGHT CAR REPAIR PARTS
For All Types of Cars

3—DIESEL-ELECTRIC LOCOMOTIVES
General Electric
44-Ton Standard Gauge
In ICC Operating Condition

10 Covered Hopper Cars
70-Ton Capacity, Standard Gauge

RAILROAD TRACK SCALE
125 Ton, 52'6", Buffalo

RAILWAY TANK CARS and STORAGE TANKS
6,000 8,000- and 10,000-Gallon
Cleaned and Tested

IRON & STEEL PRODUCTS, INC.
General Office
13496 S. Brainard Ave.
Chicago 33, Illinois
Phone: Mitchell 6-1212
New York Office
Suite 1608-9, 51-B E. 42nd St.
New York 17, N. Y.
Phone: YUkon 6-4766

"ANYTHING containing IRON or STEEL"

FOR SALE

1—3" Rd. Cap. Open End Vertical Bar Shear

1—2¾" Cap. Buffalo Billet Shear

1—5-Roll Abramson Tube Straightener ¾" to 3" O.D. Tube

ALBERT CURRY & COMPANY, INC.
#2 GATEWAY CENTER, PITTSBURGH 22, PA.

IMMEDIATELY AVAILABLE
Because of Mill Consolidation

3 LEE WILSON RECTANGULAR BELL-TYPE ANNEALING FURNACES

atmosphere-controlled with 9 bases, are available. Each is approximately 7' x 7' x 14'. Excellent when used for manufacture of steel coils, they have a capacity of 50 tons per charge. These top-grade furnaces are still set up in the plant. Tremendous values specially priced for prompt sale.

NATIONAL MACHINERY EXCHANGE
126 Mott St. New York 13, N. Y.
CAnal 6-2470

---

eastern Rebuilt Machine Tools
THE SIGN OF QUALITY—THE MARK OF DEPENDABILITY

AUTOMATICS
9/16" Cleveland Model A, m.d., 1943
4 spindle 1⅜" Cleveland, Model M, m.d.
4 spindle 2" Model K Cleveland, m.d.
2½" Cleveland m.d., Model A
3¾" Cleveland Model A Single Spindle, m.d., late
5½" Cleveland Model A, single spindle, m.d.
5¾" Cleveland Model A Single Spindle, m.d., late
No. 4D 12" Potter & Johnston, m.d.
No. 5D2 12" Potter & Johnston, m.d.
No. 5DELX Potter & Johnston, m.d., late

BOLT THREADERS
Victor Nut Facing Machine, m.d., cap. ⅜" to 2" nuts
1½" Landis 2 spindle, m.d.
1½" Landis Bolt Threading Machine, double head stay bolt, m.d.

BOREMATICS
No. 44 Heald Facing Type Borematic, m.d.
Model DB-102 Excello Double End Boring Machine, m.d.

HORIZONTAL BORING MILLS
4" bar, No. 42 Lucas, table type
No. 25T Giddings & Lewis, m.d.
No. 32 Lucas Table Type, m.d.
No. 41 Lucas Horizontal Table Type, m.d.
No. 1 Cleveland Horizontal Boring, Drilling & Milling, m.d.
2½" bar Model 25RT Giddings & Lewis, table type
3½" bar Cincinnati Gilbert Horizontal, Boring, Drilling & Milling, floor type
4" bar Universal Horizontal Table Type, m.d.
4½" bar, Model 72, Niles-Bement-Pond, m.d.
5½" bar Niles-Bement-Pond, m.d.
6" bar Sellers Floor Type, m.d.
Barrett Double End, 5" and 7" spindle, m.d.

VERTICAL BORING MILLS
16" Bullard Mult-Au-Matic, m.d.
24" Bullard Spiral Drive, m.d., 1944
36" Bullard, m.d., late 1944, Spiral Drive
40" Frorlep Model KE-10-S, m.d.
42" King, m.d.
42" Bullard Spiral Drive, vee belt m.d., 1944
44" Putnam, m.d., p.r.t.
53" Niles Heavy Pattern, m.d., p.r.t.
60" Bullard, md.

We carry an average stock of 2,000 machines in our 11 acre plant at Cincinnati. Visitors welcome at all times

THE EASTERN MACHINERY COMPANY
1002 Tennessee Avenue, Cincinnati 29, Ohio
MElrose 1-1241 CABLE ADDRESS—EMCO

ROLLING MILLS — STEEL WORKS EQUIPMENT

1—AUTOMATIC COOLING BED FOR BARS up to 2" dia. consists of run-in table, cascade section, shuffle bar section, run-out table, with all electrics, 200 ft. long.

1—32" & 20" x 110" PLATE MILL, 3-high.

1—28" x 40" HOT STRIP MILL, 2-high reversing, with 2500 HP D.C., motor generator, etc.

1—25" & 42" x 60" HOT STRIP MILL, 4-high.

1—24" x 36" 2-HIGH MILL driven by 400 HP motor, 4600/3/60.

1—22" x 36" 2-HIGH MILL driven by 600 HP motor, 4660 3/60.

1—21½" & 8" x 8" COLD STRIP MILL, 4-high.

1—8" x 10" COLD MILL including uncoiler.

2—28" 3-HIGH ROLL STANDS.

1—New 16" BAR MILL, one 3-high roll stand, pinion stand.

1—New 12" BAR MILL, four 3-high roll stands, pinion stand.

1—INDUCTION WELD TUBE MILL, 2" to 8" dia., new 1954.

1—12" MERCHANT BAR MILL with 18" roughing mill and heating furnace.

1—9" BAR MILL, 3-high.

2—MORGAN TRAVELING TILTING TABLES for 24" 3-high bar mill.

1—34" x 192" ROLL GRINDER.

2—65-TON ELECTRIC MELTING FURNACES, TOP CHARGE, with all electrical and mechanical equipment, including 15,000 KVA and 13,333 KVA transformers.

1—New top-charge ELECTRIC MELTING FURNACE with 2000 KVA transformer, 13,200 volts, 3 phase, 60 cycle.

1—72 PLATE PROCESSING & SHEARING LINE, with tables, transfers, and cut and rotary side trimming shears, scales and pliers. Modern, little used.

1—SHEET POLISHING MACHINE. Capacity 48" x 144"

1—ROLL LATHE, ENCLOSED HEADSTOCK, up to 36" dia. rolls.

1—OPEN HEARTH CHARGING MACHINE, 5 ton capacity 11' track gauge.

1—MAGNETIC SEPARATOR double pulleys, Stearns.

1—SIDE TRIMMER, Streine, maximum width 48" makes 2 cuts 3/16" mild steel.

1—SCRAP BALLER, max. size scrap roll 24" O.D. x 24" long.

1—HALLDEN STRAIGTHTENING and cutting-off machine, capacity .562" brass rod.

1—POINTER for tube 2" O.D. x ¼" wall maximum.

3—CRANE TONGS for coils, automatic, 30,000 lbs. capacity.

1—1200 HP GEAR DRIVE, 353 to 94.5 RPM 3.73 to 1 ratio.

1—3500 HP MOTOR, 11000/6000 volts, 3 phase, 60 cycle, 514 RPM, synchronous, never used.

FRANK B. FOSTER, INC.

2220 Oliver Building, Pittsburgh 22, Pa.
Cable: "Foster, Pittsburgh" Telephone Atlantic 1-2780

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DIRECT CURRENT MOTORS

Qu.	H.P.	Make	Type	Volts	R.P.M.
2**	3000	Whse.	Rev.	600	600
1**	2200	Whse.	Vent.	600	92/132
4**	1500	Whse.	Rev.	600	600
4**	700	Whse.	Vent.	250	300/700
2**	645	S.&S.	Rev.	300	1000
2	600	Al.Ch.	Mill	600	300/600
1	600	Whse.	Mill	250	110/220

SLIP RING MOTORS
3 Phase—60 Cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
1	2500	Al.Ch.	Mill	2200	296
1	1800	Whse.	Mill	2300	252
3	1500	G.E.	Mill	6600/4160-V.	444
1	1000	Whse.	C.W.	2300	441
1	500	Ideal	S-4-20	4800	708
1	500	G.E.	MT-410	2200	585
1	500	Al.Ch.	ANY	2200	505
1	500	Al.Ch.	ANY	2200	293
1	400	Al.Ch.	ANY	2200	505
1	400	Whse.	C.W.	2200	200
1	350	G.E.	1-15M	2200	1180
1	350	G.E.	MT-412	2200	450
1	300	Whse.	CW-1012	2200	704
1	300	G.E.	1-15B-M	440	1200

SYNCHRONOUS MOTORS
3 Phase—60 Cycle

Qu.	H.P.	Make	Volts	R.P.M.
1	5600	Whse.	4760	1200
2	1400	Whse.	4160	450
1	960	G.E.	460	300
1	700	El. Mchy.	440	200
1	500	El. Mchy.	2300	720
1	450	Whse.	220	128
1	300	G.E.	2200	600
1	200	Whse.	440	600

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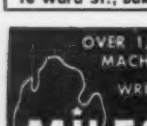

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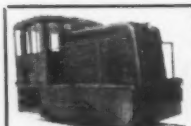

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This section appears in the first and third issue each month. Contract Manufacturing listings carry the announcements of plants offering specialized experience and facilities for the production of STAMPINGS, SPINNINGS, WELDMENTS, WIRE FORMS, SPRINGS, SCREW MACHINE PRODUCTS, FORGINGS, CASTINGS, GEARS, DIES, ASSEMBLIES, SPECIAL MACHINERY, and services such as MACHINE WORK, HEAT TREATING, PLATING, GALVANIZING, etc.

For advertising rates, kindly write The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

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ARNOLD HUGHES COMPANY
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WOodward 1-1894

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to handle 1" & 1⅛" rivets
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One press or entire stamping or forging plant. Write or phone in confidence.
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All Types And Sizes Wanted
HIGHEST PRICES PAID
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OF SURPLUS STEEL
Structurals — Pipe — Tubing
CALUMET
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NEW *WANTED* USED
Structurals, Plate, Pipe and Tubing
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fabricating plant
REPLIES CONFIDENTIAL
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GROVEHILL 6-7474

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Applicant must be a college graduate with 5-10 years rolling mill experience, preferably in the Blooming Mill. This position will offer an opportunity to demonstrate supervisory and technical skills and provide an excellent opportunity for advancement.
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Contract Manufacturing
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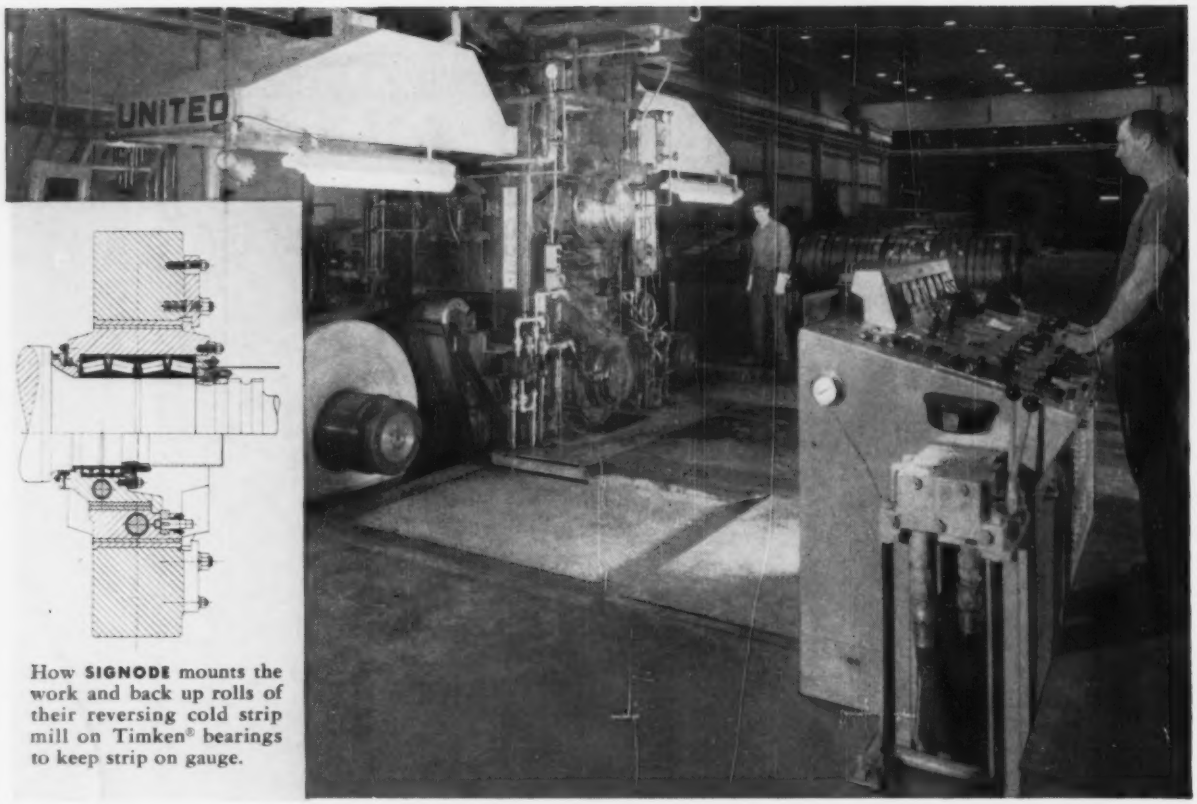

How **SIGNODE** mounts the work and back up rolls of their reversing cold strip mill on Timken® bearings to keep strip on gauge.

Signode's new strip mill controls gauge to .0001" by X-ray Timken® bearings keep it on gauge

THIS new 4-high cold strip mill built by United Engineering & Foundry for Signode Steel Strapping Company has a special X-ray gauge that measures and records strip thickness to .0001". And mounting the work rolls, back up rolls, reel and screw down on Timken® tapered roller bearings helps keep this 11¼" and 29¼" by 20" reversing cold mill turning out strip on gauge—gives Signode maximum economy, assures customers strapping of uniform gauge.

Steel mills the world over use Timken roll neck bearings because they:

1) *Require minimum maintenance.* Timken bearings are tapered and provide the high radial and thrust capacity required by modern steel mill operations.

2) *Give long life.* Rollers and races are case-carburized to produce hard, wear-resistant surfaces over tough, shock-resistant cores. In some mills, Timken balanced proportion bearings have rolled over 5,000,000 tons of steel.

Timken bearings practically eliminate friction, cut starting resistance so that scrap losses are held to a minimum. They can be grease or oil mist lubricated to cut lubricant costs to the bone. It all adds up to the lowest bearing cost per ton of steel rolled. It's why Timken bearings are on the roll necks of 1,008 mills.

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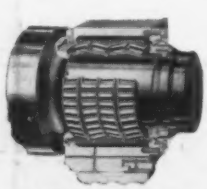

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